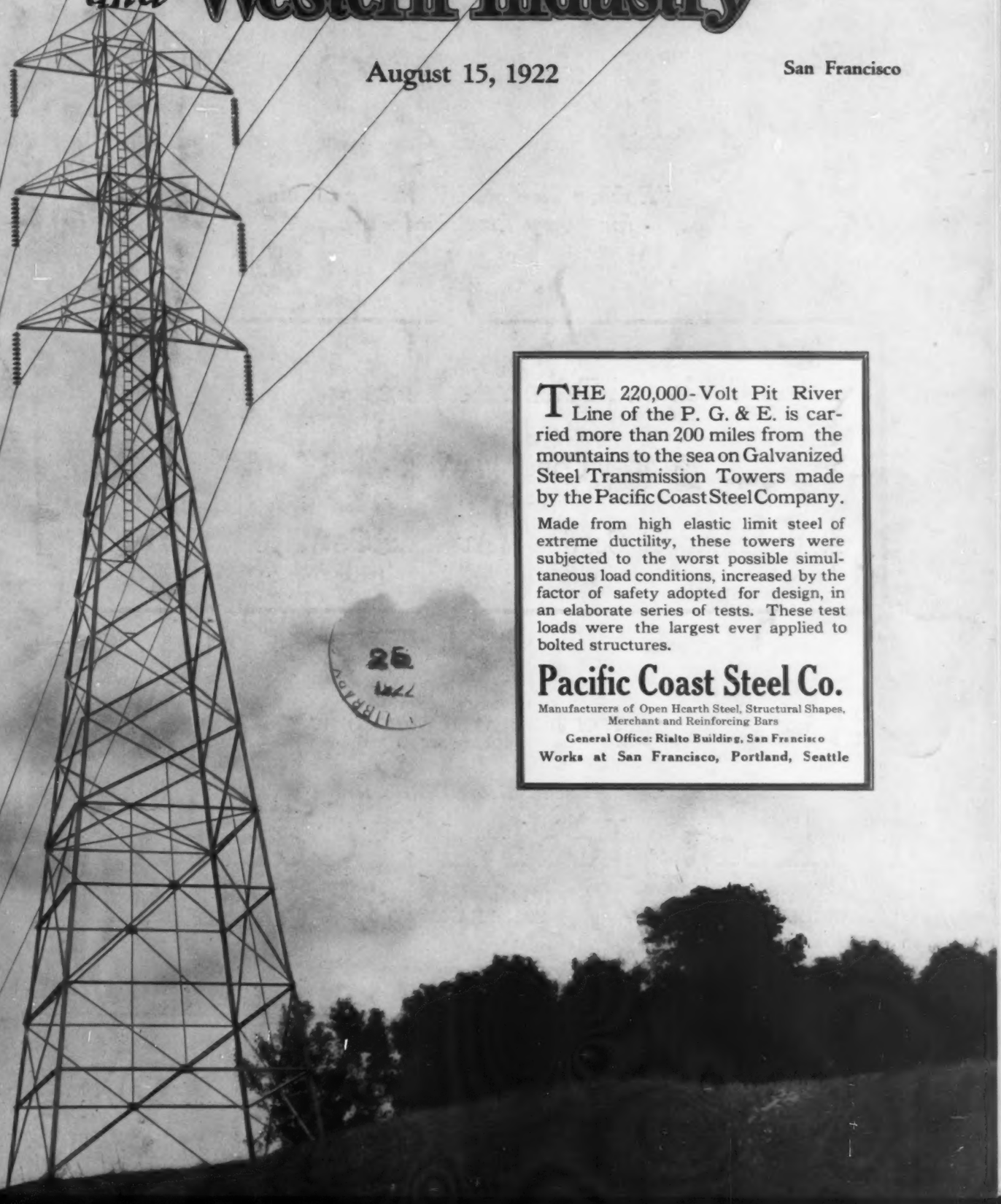
A McGraw-Hill Publication

Journal of Electricity and Western Industry

August 15, 1922

San Francisco



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Journal of Electricity and Western Industry entered as second class matter February 17, 1921, at the post office at San Francisco, under the Act of Congress, March 3, 1879.
Published the 1st and 15th of each month, at Rialto Building, San Francisco, California.

AUG 24 1922 ©CLB534017

Journal of Electricity and Western Industry

A McGraw-Hill Publication
Founded 1887
ROBERT SIBLEY, Editorial Director
Associate Editors:
Norman S. Gallison Clotilde Grunsky George C. Tenney

VOLUME 49 SAN FRANCISCO, AUGUST 15, 1922 NUMBER 4

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PUBLISHED SEMI-MONTHLY BY

McGRAW-HILL COMPANY OF CALIFORNIA — Rialto Building — SAN FRANCISCO

James H. McGraw, *President*
C. T. Hutchinson, *Vice-pres. & Gen. Mgr.*
C. M. Lindsay, *Vice-pres. & Treas.*

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CLEVELAND, Leader-News Building
ST. LOUIS, Star Building
NEW YORK, 10th Ave. and 36th St.

McGRAW-HILL CO., Inc., New York
Publishers of
American Machinist—European Edition (*Published in London*)
Industrial Engineer (*Published in Chicago*)
Chemical and Metallurgical Engineering
American Machinist Ingenieria Internacional
Electrical World Electric Railway Journal
Engineering and Mining Journal-Press
Bus Transportation Engineering News Record
Coal Age Electrical Merchandising Power

Copyright, 1922, by McGraw-Hill Company of California. Entered as second-class matter Feb. 17, 1921, at the Post Office at San Francisco, California, under Act of March 3, 1879.

Subscription rates in United States, Canada, Mexico, Cuba, Porto Rico, Hawaii, Philippines, Canal Zone, Honduras, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Salvador and Shanghai, China, $2.50 per year. Elsewhere, $4 Gold, (17 shillings). Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

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When he made that statement he had in mind just such use of energy in the home as the installation of 49 new Crawford Electric Ranges in this splendid new Portland apartment building. For that installation translated itself at once into a sharp upward trend and a steady new plateau in the domestic load curve.

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Journal of Electricity and Western Industry

A McGraw-Hill Publication

Vol. 49, No. 4 SAN FRANCISCO, AUGUST 15, 1922 Per Copy, 25 Cents

What the Pit River Development Means to the West

WITHIN the next sixty days Pit River No. 1 Plant of the Pacific Gas & Electric Company will have been placed upon the power system of California, bringing the total interconnected electrical energy up to nearly one and three-quarter million horsepower. This interconnected system in the West, of which the Pacific Gas and Electric system is one of the units, in vastness of distributing network involved, in voltages employed and in distances over which electrical energy is transmitted, embraces the greatest triumph in engineering attainment of this nature the world has thus far witnessed.

The active development in hydroelectric installation in this section of the West during the past two years has placed California beyond any other state in the Union, even surpassing New York, where Niagara is situated. Recent statistics show that over twenty per cent of the hydroelectric energy in the entire nation is consumed in California alone.

Mere figures mean little to the average citizen. An adequate appraisal of what this means can be obtained, however, from the following illustrations: Every time one horsepower in power plant development in the mountains is connected to any one of the giant transmission lines of the West, it means that twelve acres of unproductive land worth three hundred dollars will have applied to it four horsepower in motors for irrigation and general use, producing one thousand dollars in new crops per year, thus increasing the original value of the land from three hundred to an average value of twenty-four hundred dollars. Again, to industry, it means an equally wonderful thing, for every time twenty-five horsepower is harnessed in the mountains, an average of a factory and a half starts up in one of the great cities of the West—involving a capital investment of almost one hundred and fifty thousand dollars. This sets in motion a hundred horsepower in motors, turning the wheels of industry and providing employment for from thirty-three to thirty-four more people and producing over two hundred thousand dollars in new commodities. Little wonder, then, that a population of ten million people for California in the present generation is being prophesied by students of industrial growth.

Hat Creek No. 1 and Hat Creek No. 2 of the Pit River development were put into service something over a year ago and are today distributing energy throughout Northern California to the extent of twenty-five to thirty thousand horsepower. In September Pit River No. 1 will deliver over ninety-three thousand horsepower of additional energy into the transmission lines of the West. Ultimately the Pit River development will total about six hundred thousand horsepower. There is no greater builder of agriculture and industry than these great water powers, economically and efficiently developed, and to those who have fearlessly pioneered in their financing and in their engineering, the earnest support of every loyal citizen of the West should be unreservedly given.

Competent Service to the Public —the Ultimate Destiny of the Industry

TRADEMARKS, and their value to industry as a symbol representing a standard of service, are the leading topic of discussion in electrical distribution centers. It is admitted that no industry can expect to achieve real success except on the basis of a constant improvement of service to the public.

A prominent western jobbing house in promulgating this idea, has blazed a trail which the industry as a whole may well follow. It has called public attention in no uncertain words to the excellent quality of power service in the western territory, and beyond that has shaken the industry out of its lethargy and spurred it on toward taking decisive action.

From the standpoint of the jobbing house itself, this movement has been a success. From the standpoint of the industry as a whole, it has also been a success in that it has aroused everybody to the need for establishing definite standards of service. Let us not be content to think that the ultimate solution has yet been reached. Leaders of thought in our industry should not rest until some flexible means has been evolved whereby the power and prestige of the entire electrical industry can collectively be put behind everyone who is willing and able to render honest and competent service to the public. This service must be all-embracing. It must include every phase of the electrical idea from the delivery of the current to the consumer, to the sale, installation and servicing of electrical apparatus and appliances to industry, the farm and the home.

Competing with the Government in the Merchandising Field

THE only project which has ever been put into operation which can be compared with that proposed to be erected in California under the Water and Power Act is the governmental organization in Ontario, Canada. The "Hydro Commission" of that province enters quite actively into the merchandising and servicing of all types of electrical appliances, and does an extensive contracting business.

A contractor-dealer in one of the many towns in which the "Commission" maintains stores "finds the Hydro Electric Commission very unfair opposition." He says "opposition and not competition, because the 'Commission' pays no taxes and what I call overhead, they don't seem to know the meaning of."

We know a California contractor-dealer who, because of a petty grievance against his local central station, declared his intention of voting for Amendment 19, the proposed Water and Power Act. Like many another voter, he could not see how the passage of the act would affect him. He looked upon it as simply another form of the popular pastime of "corporation baiting" and directed solely at the power companies.

When his attention was directed to the sections of the proposed act which provide that the board created by the act may go into any business which they think necessary, he immediately saw a "dollars and cents" connection with his own pocket book and—changed his mind!

Two Years' Operation Under the Federal Water Power Act

IN the two years of its existence, applications have been filed with the Federal Power Commission aggregating 20 million horsepower of proposed installations. This amount is more than twice the existing water power installation of the United States.

By the terms of the Federal Water Power Act the Federal Power Commission is required to investigate all projects as to design of structures and as to the proper utilization of the resources of streams. It is required to make valuations, investigate navigable status of streams, and to pass upon applications for restoration to entry of lands within power site reserves. It has many additional duties similar to those exercised by state public utility commissions.

To perform this task, Congress has given to the Commission no personnel other than its executive secretary, and the engineer officer. It has been operating for two years with a detail of eight engineers, two attorneys, two accountants, and eighteen clerks, borrowed from the Departments of War, Interior and Agriculture. Coupled with a totally inadequate appropriation this condition has had the effect of delaying action on many important subjects.

While the record of activities of the Commission during the past two years is commendable in view of the serious handicap under which the Commission is working, it should nevertheless promptly be placed in a position where it would be possible for it fully to carry out the policies plainly expressed in the law. Having waited ten long years for a legislative pronouncement of a Government policy respecting the utilization of our huge water power resources, we should not be required to wait another long period of years before means are provided for the execution of that policy. Instead of being obliged to drift along with an administration of the law which, under existing circumstances, is necessarily insufficiently coordinated and only partially effective, the obstacles should be cleared away, whatever their nature, and there should be substituted a positive attitude both of encouragement and of assistance in the development of our water powers.

Denver Cooperative League to Enlarge Activities

REVIEWING the accomplishments of the Electrical Cooperative League of Denver during its first year just ended, the advisory committee of that organization has decided to enlarge its activities on the basis of the good work done.

The advisory committee found, as a result of the League's activities:

"The establishment of a spirit of mutual helpfulness and understanding within the industry.

"A marked increase of interest on the part of the public in electrical matters, especially improved wiring plans and their resultant conveniences.

"A higher standard plane of operation for all the component branches of the electrical industry."

The program for the second year is ambitious and extensive. Of particular interest is the plan to extend the work of the League to such other territory outside of Denver as can be served profitably, and the enlargement of the staff to meet the new duties, and an increased appropriation.

At a time when other similar organizations of the West are being questioned as to their fitness to accomplish their purpose, it is gratifying to note the general satisfaction resulting from the work of the Denver League.

Uniform System of Accounting For Electric Utilities

THERE has long been a need in the states of the Pacific Northwest for a uniform system of accounting of electric utilities due to the interstate operation of many of these companies. In order to overcome difficulties which have arisen from this situation in the past, the Public Utilities Commission of Idaho recently changed its accounting methods. The system adopted was one prepared and recommended for adoption by state commissions, by the National Association of Railway and Utility Commissions in 1920. The proposed change does not go into effect until January 1, 1923, and provides for a hearing on October 15, at which time amendments and changes will be considered.

While certain proposed amendments, changes and alterations have since been made by the National Electric Light Association, in the original system proposed in 1920, the adoption of a uniform system of accounts is a step in the right direction.

Officials of the Federal Power Commission have been endeavoring for some time to induce utilities operating on lands and sites within the jurisdiction of that body to prepare uniform accounts. Much progress has been made in the general matter of uniform accounting during the past few years. It is to be hoped that local difficulties and objections can be eliminated, and that interested utility commissions will eventually agree upon a common system.

Use of Carbon Tetrachloride For Extinguishing Electrical Fires

CARBON tetrachloride is a standard fire extinguisher in general use and is approved by the National Board of Fire Underwriters. It is particularly adapted for fires produced by short circuits in electrical equipment and apparatus, because it is a non-conductor of electrical current and when properly applied in sufficient quantity will extinguish ordinary electric arcs.

Much public interest has been aroused in press statements to the effect that carbon tetrachloride extinguishers used on a subway fire in Newark, N. J., caused the formation of toxic gases, affecting the passengers and crew of the car.

A report recently submitted by an investigating committee of the Transit Commission, assisted by experts from the Bureau of Mines and electrical engineers, is reassuring to users of this type of extinguisher. The report states in effect that such injury as was suffered was caused mainly by gases resulting from the burning of insulating materials, rubber, varnish and paint.

The use of tetrachloride extinguishers, which had been temporarily discontinued pending the result of the investigation, was ordered to be resumed, the report stating that nothing had been discovered by the closest investigation to justify its discontinuance.

Sectional Problems Still to Be Considered

ALL Westerners who look to the future must feel a great sense of satisfaction over the growing spirit of nationalization in handling electrical problems. Men in the West have long since acquiesced gladly in deferring to national bodies in the consideration of all problems that have a national background.

It must not be forgotten, however, that even in these national problems, there are certain regional or sectional angles that must be taken into consideration. For illustration, reference is made to the activities of the Commercial Section of the National Electric Light Association. In the recent discussions of the National Electric Light Association at Atlantic City, eastern representatives could not see how rural extensions could in any manner have a bearing on the activities of the Commercial Committee. In the West we know this, of course, to be one of the pivotal points upon which a great part of future commercial activities must depend.

It would be well for the national officers in appointing the committees for the next year to bear this point in mind and in the most aggravated instances there should be sub-committees of the main section for considering with particular stress such regional problems as would seem best for emphasis in the general report of the national committee.

RADIO BULLETINS

The Journal of Electricity and Western Industry broadcasts a special industrial and business news report each Monday night at 7:30 o'clock, both from San Francisco and Portland. The San Francisco report is broadcasted from station KLP, operated by the Colin B. Kennedy Company at Los Altos, California. The Portland report is sent out by the Northwestern Radio Manufacturing Company from station 7XF. Both reports are broadcasted on a wave length of 360 meters.

Western Comment on Current Events

Editorial Notes and Readers' Views on the Outstanding Aspects of Financing, Trade Promotion, Legislative and Associated Topics that have a Special Bearing on Western Business

Southern Pacific Central Pacific Controversy

The final decision in the matter of the joint control and operation of the Southern Pacific and Central Pacific railroads has again been put up to the United States Supreme Court in a brief filed by attorneys of the former company asking for a rehearing of the case. In the appeal to the court the counsel for the defendants set forth that an order requiring the Southern Pacific Company to divest itself of ownership and control of the Central Pacific Railway would give retroactive effect to the Sherman anti-trust law and create a new and untried condition in the management of the two roads.

"If the present properties were disintegrated after fifty years of unified and uninterrupted operation," the brief said, "the effect would be to create two managements where there has been but one since the origin of the properties, and also to create a new and untried condition which has no prototype.

"It would be the irony of fate," the brief continued, "if it should turn out that the unified control of Stanford and his associates were destroyed, by their stock sales" (referring to the transfer of Central Pacific stock, mostly to foreign investors) "and then find that the restoration of this unified control by repurchase of the stock was illegal."

Opinion in various sections of the West regarding the division of the two systems is divided and the parties interested are making a vigorous campaign to win public support. Needless to say, the final decision of the Supreme Court in the matter is awaited with a great deal of interest.

Oil Prices at Pre-war Levels Again

Two recent reductions in the price of crude oil announced by various companies have had a reactionary effect which has not been confined to the oil industry alone. Of chief importance is the announcement by the California State Railroad Commission of two cuts in the price of gas to the consumer. This action was taken following an agreement with the various public utilities that gas rates were to be decreased in keeping with any reductions in the price of crude oil.

The effect in the oil fields has been marked by the closing down of a number of wells which no longer can be operated at a profit with crude oil at its present price, namely, 60 cents a barrel. It is interesting to note that prices are the lowest they have been since July, 1916, when low gravity crude was selling for 58 cents a barrel. The peak in the wave of high prices was reached in July, 1920, when one of the largest companies was offering $1.60 per barrel.

Despite the wave of pessimism among operators which followed the reduction in prices, there has been little slackening in the number of new wells which are being started. Twenty-seven wells were started during the week of July 30 and several large producers brought in during that period.

The relation of the cut in price to oil stocks has been commented on by one of the financial writers in a large western daily in a noteworthy fashion. This writer says:

> The margin of profit in oil has been, of course, immense, but whether it is large enough to stand the great waste that present conditions seem to indicate is doubtful. For some little time past the sales of gasoline and lubricating oils appear to have been carrying the larger part of the burden of the business, and these products represent much less than half of the crude output. If the other part of the crude, more than half of the output, cannot be effectively distributed, both the oil producers and refiners will certainly come to the time when they must revamp their estimates of profit.

Home Ownership and Community Stability

That the stability of a community is measured not only by the number of its home dwellers but also by the number of its home dwelling owners, is the contention of the Department of Industries of the Portland Chamber of Commerce in a bulletin which has just been issued on the subject of home ownership. An exhaustive study has been made of the 1920 census figures and some interesting facts have been brought to light, especially regarding the standing of the various communities of the West in the matter of home ownership.

The Chamber of Commerce's compilation shows that four western cities rank among the first five in the number of persons per dwelling in cities having a population of over 100,000. The following table shows the relative positions of several western communities.

City	Ranking	No. of Dwellings	Population	Persons per Dwelling
Oakland	2	47,297	216,261	4.6
Los Angeles	3	125,004	576,673	4.6
Portland	4	54,664	258,288	4.7
Spokane	5	22,389	104,437	4.7
Salt Lake City	11	23,685	118,110	5.0
Seattle	15	60,516	315,312	5.2
San Francisco	21	90,132	506,676	5.6

While none of the western cities rank as highly in the percentage of homes owned, as the following table shows, the recent large increase in home building would doubtless increase the ranking of many of the cities.

City	Ranking	Percentage of Homes Owned
Seattle	9	46.3
Portland	12	44.6
Spokane	13	44.6
Salt Lake City	14	44.3
Oakland	16	42.0
Los Angeles	24	34.7
San Francisco	29	27.4

In commenting upon the figures, the Chamber of Commerce bulletin says:

It would appear that the most important thing to know is the ratio of home dwellers (in purchased and rented homes) to the total population. Then, to further indicate the stability of citizenship, show what percentage of these dwellings are owned and what percentage are rented, and lastly show to what extent the purchased homes are free from encumbrance.

If the home ownership figures are used (as is usually the case) without a statement of the relationship of home dwellers to total population, the study is worthless.

Wisconsin Ruling Important to Public Utilities

The Supreme Court of the State of Wisconsin has recently handed down an important decision involving the Wisconsin Railroad Commission, the city of Eau Claire and the Wisconsin-Minnesota Light and Power Company, which promises to have an important bearing on the entire nation's system of utility rate fixing. In 1914, the aforementioned utility absorbed the system of the Chippewa Valley Light and Power Company, which was generating and furnishing power to a number of small municipalities in Wisconsin and Minnesota. The larger company, to insure a sufficient supply of power to meet its growing demands, shortly thereafter entered into a contract with the predecessor of the present Northern States Power Company to purchase a large block of power from the Wissota project, then under construction. The price to be paid for this power was based upon a cost of $3,000,000 for the project. However, approximately $7,000,000 was spent on the development and the rates in the original contract were revised to meet the new conditions.

The Wisconsin-Minnesota Light and Power Company immediately started a campaign to secure more consumers. A so-called loop system was constructed to which all of the cities on the lines were connected and new districts added from time to time.

In fixing rates, the Wisconsin Railroad Commission treated the loop as a unit. The cities were divided into classes, as were the consumers. The city of La Crosse, situated at least 100 miles from the Wissota dam, was given the same rates as Eau Claire, located in close proximity thereto. The commission estimated that the plants originally supplying the loop were unable to supply the demand for power owing to the additional load and that the entire output of these plants together with 71.68 per cent of the output from Wissota was needed to meet this demand. Consequently in fixing the rates 71.68 per cent of the cost of the dam was apportioned to the loop system.

In the lower court the appealing municipalities complained of this allocation and strenuously maintained that the commission had no right to regard the loop as an entity in fixing just and reasonable rates for service. The lower court, however, held that the action of the commission was lawful. It held, none the less, that an unreasonable proportion of the cost of the Wissota dam was apportioned to the loop and for that reason reversed the order of the commission. From the judgment so entered the Wisconsin-Minnesota Light and Power Company appealed.

In its decision affirming the judging of the lower court the Supreme Court of Wisconsin declared that it was deeply impressed with the thought that the fundamental basis upon which the commission proceeded in fixing the rates, and of which the plaintiff cities complained, results in a great injustice to those cities originally served by the Chippewa Valley Light and Power Company. As a result of the basis adopted by the commission those cities are now charged a higher rate to enable cities later brought into the loop to enjoy service at a lower rate than that at which they otherwise could be served.

The Wissota dam, the court says, would never have been built originally for the service of the Wisconsin municipalities. Its construction was prompted by the contract with the Northern States Power Company, and had that contract proved unprofitable it safely may be assumed that the utility would not have sought the market afforded by the various cities and villages which it added to the original loop system. The latter development, the court holds, was not economical, and by treating the loop system as a unit the cities originally furnished by the prior developments are now called upon to bear the burden necessary to yield a reasonable return upon approximately 70 per cent of the cost of constructing the Wissota dam.

There was no contention that the rates fixed yielded an unreasonable return to the utility. The complaint is that the return to, or income of, the utility resulting from the rates fixed by the order of the commission is unlawfully and unreasonably distributed among the municipalities constituting the so-called loop system. The question, therefore, before the court was whether the commission was acting within the legislative provisions in treating the loop system as a unit for the purpose of fixing the rates to be charged by the Wisconsin-Minnesota Light and Power Company to its consumers.

The decision of the court concluded with the following statement:

"Under existing statutes the commission is required to treat the municipality as a unit and to base its rates upon the cost to the utility of serving the individual municipality rather than the average cost of serving many distinct and scattered municipalities. Because the commission in fixing the rates under review treated the loop system rather than the individual municipality as the unit, it proceeded upon an erroneous fundamental basis and its order must be vacated and set aside."

Two of the judges sitting upon the case handed in a dissenting opinion, holding that nowhere in the public utility law is there evident any intention that such a utility be dealt with in fragments or be limited in its service to one municipality.

It is evident that the ruling of the court has robbed the Wisconsin Railroad Commission of its full rate-making powers and has, moreover, set up a new principle in rate making based upon the location or proximity of communities to the generating station. Under the ruling it would seem that every town must have a rate of its own. That this would retard water power development and have a restraining effect upon transmission companies and interconnected systems is apparent, should that principle be accepted in other courts.

Letters to the Editor

Seattle Electric Club Effective Medium For Promoting Electrical Idea

To the Editor:

Sir: The organization now known as The Electric Club of Seattle is the final stage of a series of organizations originating in the Electrical Contractors' Association, all of the preceding organizations having gone out of existence.

The present Electric Club was formally organized about eight months ago and has shown a steady if not rapid growth. However, on account of its success up to this time, it is confidently felt that its growth will be more rapid from now on.

Unlike previous electrical organizations here, which have limited their membership to some particular branch of the industry, the present one embraces all lines, and we now have representatives from all the jobbers and power companies as well as from the dealers, manufacturers, contractors, etc.

It is the aim of the club to handle the problems of the various branches through committees representing them. Thus we have a "Contractors' Affairs" committee, a "Dealers' Affairs" committee, and so on, in addition to such general committees as the "Legislative," which handle all legislative matters affecting the organization or its members, and the "Electrical Home" committee which handles the details of staging the electrical homes shows. Two of these homes are now under construction, one in the north end and other in the south end of the city, and are expected to be opened to the public about September first.

Another important general committee is one known as the "Recreation" committee. This one handles all social affairs of the club and recently arranged a very successful picnic. It was estimated that about five hundred Seattle electrical men and their families attended this affair, and at the invitation of the committee Tacoma sent about fifty more. A certain amount of social contact between the members and their families seems to be desirable, if not a necessity, and the Recreation committee has now become an important institution with us.

Perhaps the most important committee of all is the one charged with furnishing the speaker for the weekly luncheons. At least one speaker is expected to be in attendance at these luncheons who, after the transaction of the regular business and receipt of committee reports, is given the balance of the period to speak upon any topic he may choose. Usually the topic chosen is one foreign to the electrical business, but is no less welcome on that account. In fact, it seems to be pretty generally agreed that a subject unrelated to our every-day business is preferred.

This committee's work is by no means easy, as speakers frequently fail them at the last moment and a substitute has to be found, but this they usually manage to do somehow.

Reflection upon the activities of the club for the past few months convinces the officers that this organization is a decided success and the opportunities for furthering its usefulness in the future are many. With this in mind the membership committee is now making its plans for a more active campaign for members, which it will institute as soon as the vacation period is over.

Obviously, the nearer the organization comes to including all those actively engaged in the electrical industry in its various branches, the more useful it can be made for all.

J. J. AGUTTER, Pres.

Seattle, Wash. Seattle Electric Club.

Influx of German Made Irons Creates Fire Hazard by Faulty Construction

To the Editor:

Sir: I think the following paragraphs from the publication "Safeguarding America Against Fire," issued by the National Board of Fire Underwriters, is of sufficient interest to your readers to give it publicity through your columns.

"In violation of all tradition concerning the post-bellum beating of swords into plowshares, German effort in this regard seems to have been directed in part to the turning out of electric pressing irons. Once again, in this product, the vaunted Teutonic thoroughness is displayed, for these irons are most thoroughly defective. And, moreover, they have descended upon our shores in a veritable avalanche. A shipment of 180,000 of these cheap appliances—fire breeders, in all truth—was recently unloaded at the port of New York.

These German irons retail at one dollar but are not accompanied by stands. This introduces an additional hazard, although it is the irons themselves that present the chief danger. They are flimsily constructed and, since their period of service is extremely brief, they are expensive at any price. The flexible cord attached to them is of sub-standard, No. 32 gage, whereas No. 18 is prescribed by underwriters as a minimum requirement. Furthermore, the insulation is inferior and will not stand much usage. The plug is of a wooden type long ago discarded in the United States.

"An engineer who tested four of these irons found that not a single one lasted long enough to undergo the complete tests which it was planned to carry out, the heating element breaking down in from three to thirty-five minutes. In the interior of the iron, the mica insulation was in small pieces and insufficient to prevent contact with some part of the appliance.

"In two of the irons, short circuits immediately occurred, due to the poor assembly. Such construction is sure to result in the blowing of fuses on the circuit employed. Also, owing to the scant insulation, there is considerable likelihood of shock when the irons are employed in the neighborhood of plumbing fixtures.

"Potential fire hazards—arising, indeed, not from poor construction, but from careless or ignorant use—already exist in abundance with the best of American-made irons. There is no room in this country for irons which are inherently dangerous, even when properly employed.

"News of these foreign visitors has been sent broadcast, and it would seem, in the circumstances, that the electrical industry might sharpen its publicity weapons and launch an attack upon this Teutonic intruder. The sale of this defective appliance cannot but create an undesirable impression in the public mind that may affect the popularity of approved American irons. To the average purchaser all irons look alike."

D. E. HARRIS,

V. P. and Sales Manager,

San Francisco. Pacific States Electric Co.

Accurate Knowledge Needed Before Electric Heating Is Installed in Home

To the Editor:

Sir: Your editorial in the July 15th issue, subject "Need for More Attention to Electric Heating," performs a valuable duty, namely—getting the haphazard electrical dealer, and even an electrical engineer, to think and analyze the case at hand, before advocating electric heating.

The "cause" is most frequently injured by the engineer supplying electric heating which proves unsatisfactory, due to undercapacity of heaters, or overly-expensive monthly power bills. Both objections are injurious. The case of installation of heaters having insufficient capacity, is usually a case where the electrical man responsible has endeavored to keep down the power bill, but has overlooked the fact that his client will freeze.

In laying out a heating job, not only must we go over the plans of the home, usual outside temperature, etc., but

must talk with the client, and learn if he intends to keep the whole building heated, or just so many rooms—in short, really get all the facts and tell him honestly what it will cost him to heat his home.

If your estimate of monthly cost meets your client's pocket book—you have made a satisfied customer and an advocate of electrical heating.

If the monthly cost of operation is more than he can pay, it is timely either to discourage him from electric heating, or have him modify his heating requirements.

We are glad to see the "Journal" writing editorials of this nature. Articles such as this will stop many a misapplication of electric heating. Keep up the good work.

ELBERT KRAMER,
Supply Division,
Westinghouse Electric and Manufacturing Co.
San Francisco.

Commends Article on Improving Efficiency of Personnel Relations in Industry

To the Editor:

I have certainly enjoyed the article by Mr. J. David Houser appearing on page 47 of your July fifteenth issue, and would appreciate it if you would convey to him my congratulations on the able way that he has handled this most important and most difficult subject.

I am particularly impressed with his paragraph on "reporting downwards." It is just such practical suggestions that we need and less of the complicated, idealistic theories that fail to work out in practice.

I always find something of particular interest in every issue of the "Journal."

W. H. CRAWFORD.

Portland, Oregon.

Possibilities of Electric Heating Advocated by Western Manufacturer

To the Editor:

Sir: Your editorials on electric heating in the July 1 and July 15 issues are noted, and the rapidly rising interest in this branch of the industry and its potentialities for central station, jobber, and contractor, are highly pleasing to us.

We have a criticism of the editorials to offer which you will no doubt be glad to know, for it is constructive in character and permits the broadcasting of news of electric heating development in an even more favorable light than you have shown it and it has been the subject of some comment that the thought was not developed in your editorials.

Reflected heat, or as it is coming to be popularly known, "flood heat," adds an element of efficiency to the ordinary electric heater which merely gives off heat from the coils, and the efficiency of which must be gauged by the amount of current consumed. The element of efficiency referred to is the reflecting of the heat into the room, or flooding the room with heat, and the result is just as instantaneous after turning on the current as the result from an electric light is after turning on the current, and just as there are other elements than current consumption to the efficiency of an electric light, there are other elements to the efficiency of an electric heater.

For instance, a group of people may gather in a room for a short period and have the room flooded with heat upon turning the switch. Assume that the room is a dining room, or a bed room, or even a living room, and that the period during which the heat is wanted is comparatively short—say an hour. A Majestic Heater of 2,000 watts will amply flood the room with heat immediately, whereas a heater of considerably larger wattage would be needed in order to give even a belated warmth to the air, or else it would have to be turned on some time in advance. The popularity of Majestic Heaters in lodge rooms and such places where there is definite expense connected with the earlier turning on of the heat, is suggestive of the advantage mentioned just above.

There is almost no type of building that we are not heating with pleasure to the owners. The installations include residences, apartment houses, hotels, summer resorts, hospitals, dance halls, offices, theaters, battleships and passenger ships.

You will no doubt be proud to mention Majestic Heating, for it is a logical development of world-wide fame and importance, and its progress and future are unlimited.

T. D. MACMULLEN, Secretary,
San Francisco Majestic Electric Development Co.

Endorses Editorial on Electric Heating in July Fifteenth Issue

To the Editor:

Sir: I want to endorse what you said in the editorial appearing in the "Journal" of July 15 on Electric Heating. It is right to the point and certainly timely.

If it is possible that electrical men take seriously the sales arguments about "fat watts," "trained watts" and "directed watts" they should reflect that a watt is a "unit of electrical power or rate of working equal to 1/746 of one horsepower" and not a flexible quantity.

Failure in the past to install heaters of proper capacity may be excused on the ground that rates were so high that electric heaters were usually only practicable for auxiliary heating. But today with reasonable electric rates general heating is becoming popular and is most satisfactory where, as you say, due care is used in designing the system, installing it and operating it. That certainly means sufficient wattage in our climate to take care of a temperature difference of at least 30 degrees F.

W. WESLEY HICKS.

San Francisco.

Suggestion Is Made that More Attention Be Given to Electric Building Heating

To the Editor:

Sir: In looking over the "Journal" of July 15 I was particularly interested in your editorial headed "Need for More Attention to Electric Heating." It seems to me that this is very well written and emphasizes the facts with considerable force.

Apparently there has been very little attention given to electric building heating, but on account of the favorable conditions existing in California, I am convinced and have been for a number of years, that there are possibilities in this line beyond the comprehension of the average person and I believe that the next few years will prove that this field is practically unlimited, but in order to have satisfactory results it is, as stated in this article, necessary to correctly determine the amount of heat required before making the installation. If heaters of too small capacity are installed, it will be impossible to satisfy the users, but all installations that have come to my notice which were properly estimated and installed have been completely successful. I would be very pleased to see more attention given to electrical building heating in the future.

A.STRAUCH,
San Francisco. Pacific Gas and Electric Company.

Builders of the West

A SOUND financial idea which brings about cooperation between a public utility company and its customers and furnishes capital for continued improvement in that utility is a noteworthy discovery. Therefore when August F. Hockenbeamer, vice-president and treasurer of the Pacific Gas and Electric Company, in 1914 conceived the idea of the direct sale of public utility securities to consumers and employes, he was building history in the financial and economic world.

AUGUST F. HOCKENBEAMER

Railroad official, business executive and financial expert, whose clear judgment has wrought a business policy of signal importance to the progress of the West.

Mr. Hockenbeamer's whole experience was an unconscious preparation for such an important discovery. He was born and brought up in Logansport, Indiana, a railroad town of importance. After a public school and business college education he went to work in the Logansport office of L. F. Loree, division engineer for the Pennsylvania Lines. Here he began at the bottom of the ladder as messenger and office boy. In six months he was promoted to the position of stenographer and from that time he advanced steadily to increasingly important places until, at the age of thirty-one, he was chief clerk to the division superintendent at Richmond, Indiana. He then became assistant engineer of maintenance of way for the Baltimore and Ohio railroad, after which he was made assistant general superintendent of motive power of the same road. It is to be noted that all these positions bore upon the financing and economic aspect of the railroad business. His next step was to go to New York City as assistant to Mr. Loree, now the president of the Rock Island-Frisco system. But he was not to remain long in this position. The great banking concern of N. W. Halsey and Company, recognizing his sound financial judgment, made him their expert on railway investments and corporate properties. He continued with Halsey and Company for five years, finally coming to San Francisco in 1907 as their agent. He came to stay six months. He has remained fifteen years. The Pacific Gas and Electric Company also saw the keen business judgment of Halsey's expert and made him such a tempting offer that he remained in the West where he has become a notable financial figure.

It was in 1914, just prior to the World War and after Mr. Hockenbeamer had added the positions of second vice-president and treasurer to that of comptroller of the Pacific Gas and Electric Company that he worked out the policy of selling public utility stock to customers. Up to this time the progressive activity of the Pacific Gas and Electric Company could be financed easily by the mortgage system. But there is a limit to borrowing on this basis. And there is no mechanism for the adequate distribution of stocks comparable to the machinery for distributing bonds. Yet under the law of the land such a utility as the Pacific Gas and Electric Company must operate. It cannot refuse to serve new customers. Its activities must penetrate farther and farther into virgin territory. In order to do this it must have new capital. Mr. Hockenbeamer saw that if he could make shareholders of the consumers of the company it would bring about a fine sense of cooperation between the utility and the public. It would also solve the financial problem. But it took the public almost two years to see what had presented itself so clearly to Mr. Hockenbeamer. In the meantime he tested his plan in a small way in the California Telephone and Light Company which he had organized in 1913. It proved a success. The Pacific Gas and Electric Company also found it a device of unparalleled success. During the year 1914 this company sold $8,801,000 worth of preferred stock. From that time to July, 1922, a total of $30,278,300 worth of these securities were disposed of direct to 21,342 individuals. On the payment of the 31st consecutive dividend in May, 1922, first preferred stockholders had received dividends totaling over $11,000,000. An important point is that of the 49,036 investors in the company's securities 32,622 reside in California.

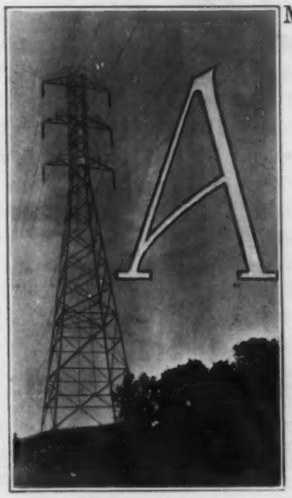
To August F. Hockenbeamer, then, because of his working out of a financial policy which is bringing about a healthier and more harmonious relationship between groups of society in this country, is this number of the Journal of Electricity and Western Industry affectionately dedicated.

Lower Hat Creek Falls near Hat Creek No. 2 Development

Insuring California's Industrial and Agricultural Growth

How the Pacific Gas and Electric Company is Spending Eight Million Dollars Yearly to Meet Power Demands by Developing 600,000 Horsepower From Seven Projects on the Pit River

By NORMAN S. GALLISON



Standard 220-000-volt transmission tower

AMPLE power is the first requirement of an industrial structure. Power is the magic medium that transforms raw materials into usable products, that turns the wheels of transportation, transforms the desert into the garden and builds great manufacturing cities. California has a bounteous treasure of raw materials, millions of acres of cultivable land, and countless thousands of people are ready to flock into that state as soon as sufficient power is developed to give them occupation.

The only available source of power which will provide for this future growth lies in the development of hydroelectric energy. California possesses about fifteen per cent of the total possible hydroelectric power in the entire country. Only about one million and a quarter out of a possible nine million horsepower have been made available. Although but one-seventh of this has been developed, many of the remaining sites are difficult of access and distant from possible markets. Huge storage dams are often necessary, and flumes, tunnels and transmission lines must be built in rugged mountainous country at great expense. Despite this, in order that the inevitable growth of the state may not be retarded, its power companies are planning the development of a million and three-quarters additional horsepower within the next ten years at a cost of six hundred million dollars.

The Pacific Gas and Electric Company, the second largest public utility in the world in gross business involved and the largest in size of territory served, is doing its share in promoting the inevitable economic growth of the state. This company already serves over one-half of the population of the state, from twenty-eight hydroelectric plants which produce over three hundred thousand horsepower. To provide for future demands, this company undertook the task of harnessing the Pit River in June, 1920. This river, 250 miles north of the San Francisco bay region, the principal power market, drains the four counties in the northeastern corner of the state, Siskiyou, Shasta, Lassen and Modoc. The ultimate development embraces a chain of seven power plants with a contemplated capacity of 600,000 hp. at an expenditure of ninety million dollars.

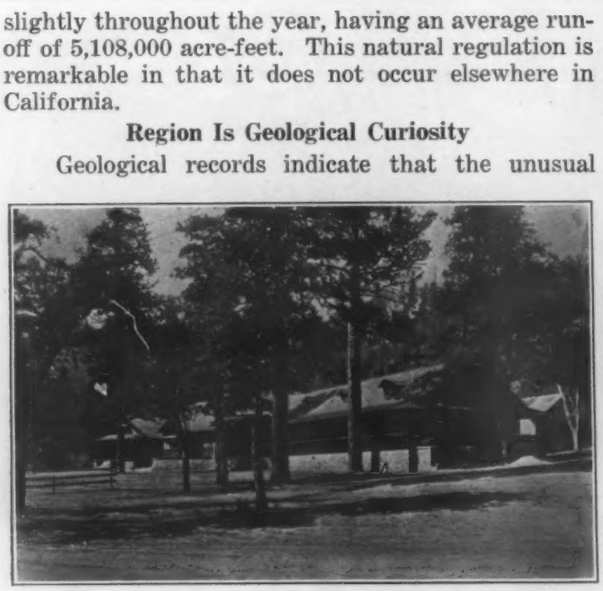
Unusual progress has been made since the inception of this plan. Two plants on Hat Creek, a tributary to Pit River, have been in operation almost a year, and with the opening in September of Pit No. 1 power plant, the first large link in the chain will have been forged.

The Pit River is unlike other California streams in that no storage reservoirs are required. The river drains a basin of 5,906 square miles consisting of mountainous areas, plateaus and porous lava beds, at an average elevation of 3,000 ft. The annual precipitation ranges from a minimum of 14 in. in the plateau regions to a maximum of 60 in. in the mountainous areas. The lava beds constitute an underground reservoir and the flow of the river varies but

slightly throughout the year, having an average run-off of 5,108,000 acre-feet. This natural regulation is remarkable in that it does not occur elsewhere in California.

Region Is Geological Curiosity

Geological records indicate that the unusual water conditions are a result of volcanic action. The Cascade range, of which Mt. Shasta and Mt. Lassen are outstanding peaks, at one time formed a dam across what was formerly an extension of the Sacramento Valley. Much of the drainage basin of the Pit River is composed of lava table lands built up by volcanic eruptions from the surrounding mountains. The Pit River has torn a chasm through the volcanic range and drains into the Sacramento. A large portion of the area drained consists of alternating and irregular areas of lava and sandy meadows, extending northward into Oregon and are a desolate waste. The rainfall in this region, which was once a gigantic lake, does not run off but sinks into the porous lava, coming to the surface in the form of giant springs when it meets impenetrable clay beds in the Fall River and surrounding valleys.



Built upon a foundation of native stone the rustic clubhouse, center of social activity on the Pit River Development, has a beautiful setting beneath large pine and oak trees.

The Pit River itself is a moderate stream until its juncture with the Fall River. Hat Creek and Burney Creek and other tributaries which rise in numerous springs in the lava beds, swell its volume until it approaches a minimum flow of 2,500 sec.-ft. at the last proposed diversion point above Big Bend. The river falls 2,104 ft. in a distance of 60 miles and engineers have estimated that 600,000 hp. is capable of being developed, or about three billion kilowatt-hours per year of additional energy. Increase in demand for electrical energy on its system of over 100 per cent from 1911 to 1920 convinced the Pacific Gas and Electric Company that this addition, twice the present kilowatt-hour output, will be needed in the next ten years. Hence, to insure sufficient future production, transmission and distribution facilities to meet this demand, the development of the Pit River was undertaken.

Before the proposed development could proceed it was necessary to purchase the properties of the Mt. Shasta Power Corporation, the California Power and Manufacturing Company, and certain water rights and claims of various individuals and concerns. To provide for what appeared to be a power shortage in 1917, it was decided to construct two preliminary plants on Hat Creek, not far from its juncture with the Pit. Next Pit No. 1 plant, which draws its water from Fall River, and then a chain of four power houses on the Pit River itself ending with Pit No. 5 at Big Bend.

Construction Begun in 1920

Construction on the two Hat Creek plants was begun in June, 1920, and continued under adverse climatic conditions throughout the winter of 1920-21, being completed in September, 1921. Hat Creek, which has a volume of 600 sec.-ft. at its juncture with the Pit, flows northward from the slopes of Mt. Lassen. It has numerous tributaries which emerge from the lava beds in the form of giant springs and has a fall of about 400 ft. in a few miles.

In the Hat Creek No. 1 development water is diverted by means of a rock filled timber crib dam, about 8 ft. high and 200 ft. in length, into a 2,750-ft. ditch terminating in a small forebay. The water enters the power house through a penstock 1,600 ft. long under a head of 217 ft. The power house is a steel frame reinforced concrete structure equipped with a 15,000-hp. vertical turbine direct connected to a 12,500-kva. generator. Power is transmitted at 6,000 volts to Hat Creek No. 2 without transformation.

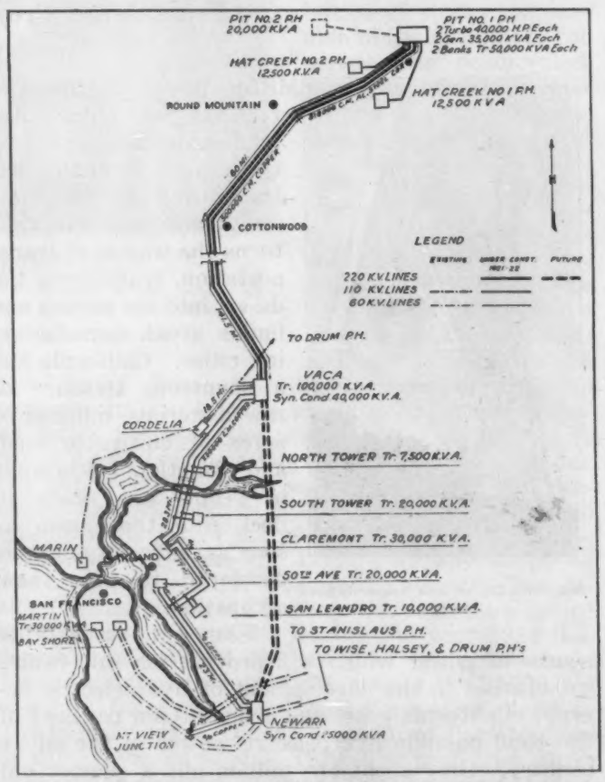


Chart of the Pit River transmission system. Note that the chart has been condensed and approximately 100 miles of line from Cottonwood to Vaca have been omitted.

Water for Hat Creek No. 2 plant is diverted just below Hat Creek No. 1 power house by means of a

similar dam about 300 ft. long, extending diagonally across the creek. From the diversion point to the head of the penstock, a timber flume has been built terminating in a concrete lined forebay. The penstock is 8 ft. in diameter at the turbine and 400 ft. in length. The effective head is 196 ft. Power equipment is identical with Hat Creek No. 1, but owing to additions to the flow from Crystal Lake more power is being obtained. Energy from this plant, supplemented by that from Hat Creek No. 1, is stepped up to 60,000 volts and transmitted to Cottonwood. The transformer equipment consists of four 8,000-kva. water cooled transformers wound to operate at 63,500 or 110,000 volts.

Pit No. 1 Is First Large Unit of Project

In the Pit River No. 1 development, Fall River is diverted by a low concrete structure 600 ft. in length. This stream, which contributes 1800 sec.-ft. at the diversion point near its juncture with the Pit, rises in the Modoc lava beds to the north. Water is conducted from the diversion dam through a canal sufficient to carry the entire flow of the river to a pressure tunnel 10,160 ft. in length. The tunnel is a horseshoe section for a considerable part of its length. The remainder is circular section. The tunnel is concrete lined and the horseshoe section is approximately 16 ft. high with a bottom width of 13 ft. The tunnel is built on a three per cent gradient and has a fall of about 30 ft. from portal to portal. The tunnel discharges into a circular surge chamber, 55 ft. high and 60 ft. in diameter, from which two penstocks, 1,400 ft. long and tapering from 11 to 9 ft. in diameter, lead to the power house. The effective head is 418 ft.

A handsome reinforced concrete and structural steel building of striking Gothic design, the power house of the Pit No. 1 development is a monument in itself. It is located on a bench above the river, necessitating the construction of a tailrace of 1,200 ft. It contains two vertical turbine units, direct connected to generators of 35,000-kw. capacity each, making the total installation 70,000 kw., equivalent to 93,300 hp. The low tension switching apparatus is located in a rear wing, with the transformers and high tension switching equipment outdoors. The transformers, seven in number, of 16,667-kva. capacity, are connected in two banks of three each, one being used as a spare.

Power generated at 11,000 volts, supplemented by that from the two Hat Creek plants, will be stepped up to 110,000 volts temporarily. Later it will be raised to 175,000 volts and eventually to 220,000 volts. This will be a world's record, and is expected to be accomplished in 1923 and all transformers, insulators and line construction have been erected in preparation for it. From Pit No. 1 the transmission system consists of two lines on separate towers below the snow line to Cottonwood, a distance of 60 mi. by one line and 70 mi. by the other. From this point the line consists of single towers carrying both circuits. The line then extends 142 miles south to Vaca substation, where step-down transformers, and synchronous condensers for line regulation, are installed. From this point the present plans call for an extension of the 220,000-v. line to Newark in Alameda county, where identical equipment will be installed. Until the development of Pit River No. 3, power will be brought to the bay cities

Hat Creek No. 1 power house viewed from the penstock line. This plant is situated about two miles below the town of Cassel. This plant with an installed capacity of 15,000 hp. has been in operation almost a year.

by way of Carquinez Crossing, which has been reconstructed for 110,000-volt operation.

Four Large Plants Below Pit One

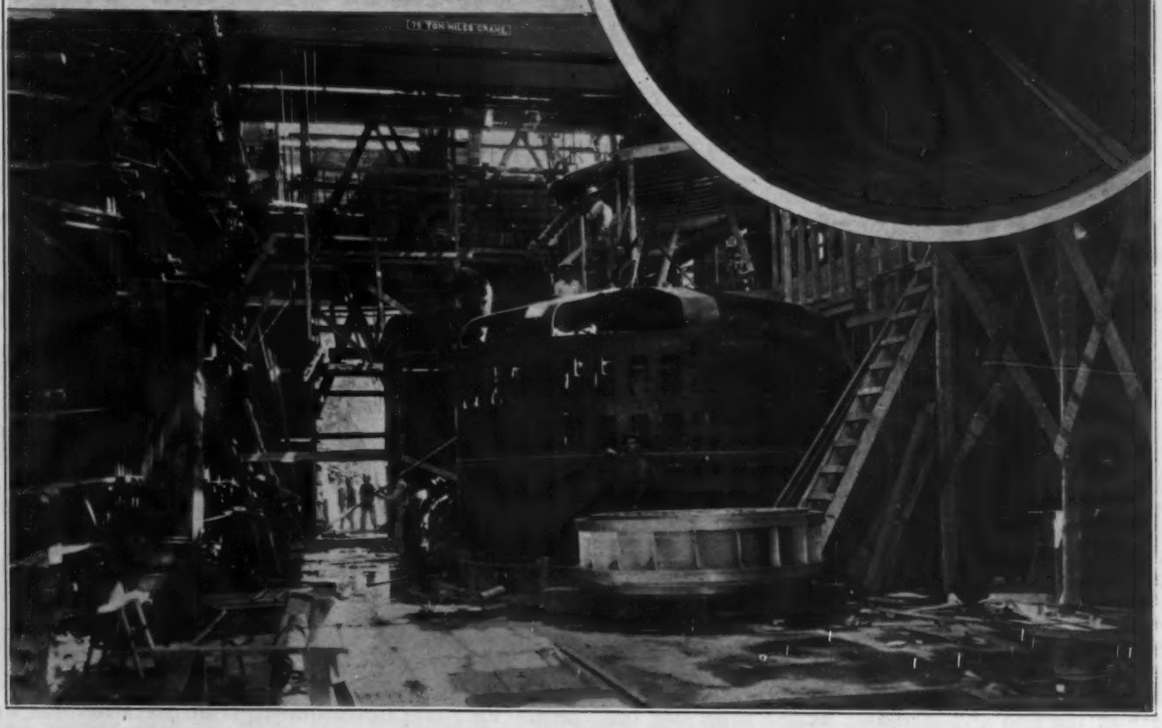
Below Pit No. 1 four additional developments are planned. Pit No. 2 project will be constructed about a mile downstream and will consist of a diversion dam, outlet tunnel and 2½ miles of open canal. Here the installed generating capacity will be 23,500 horsepower.

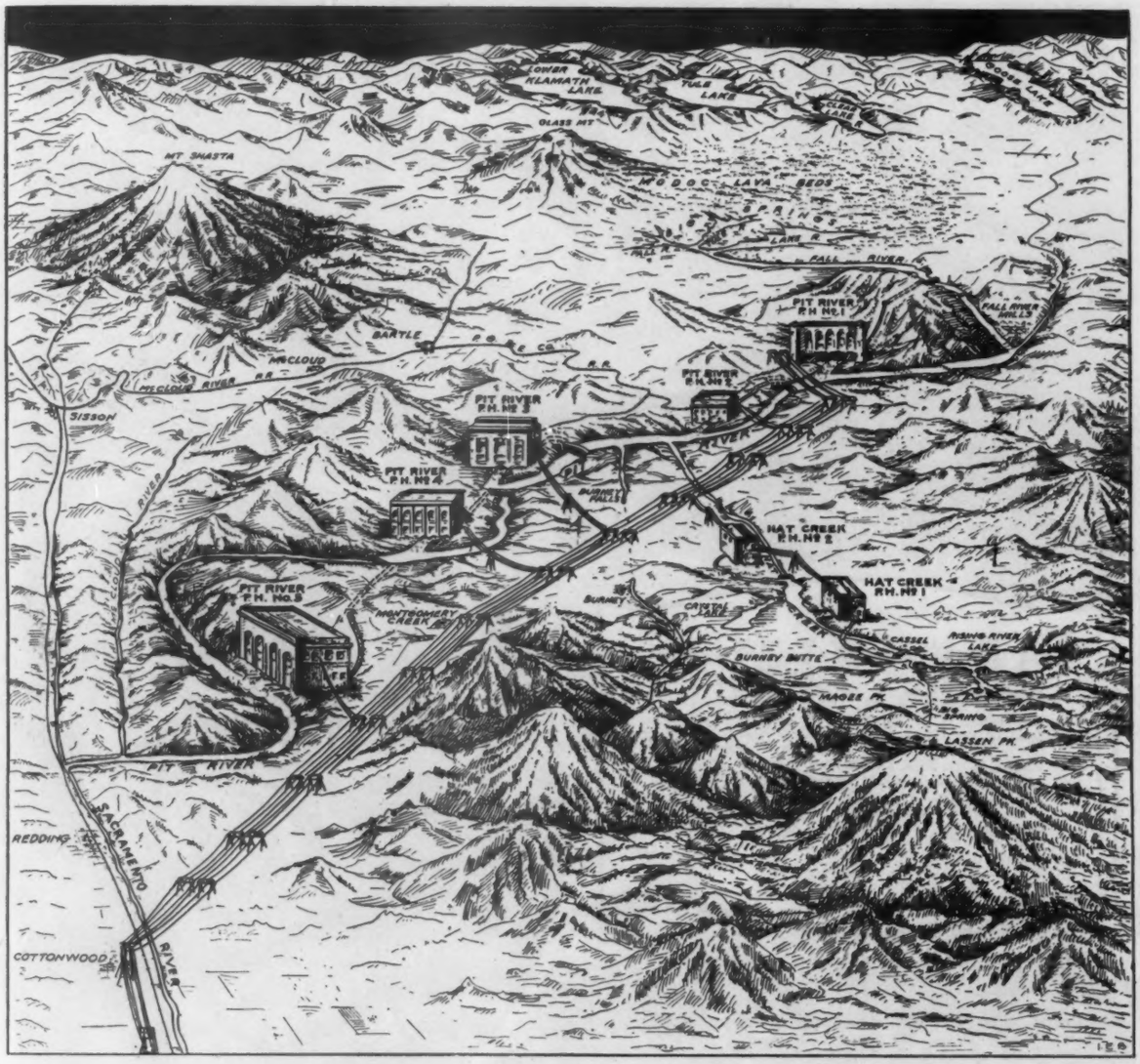
Pit No. 3 development will be located at a point below Peck's Bridge where a diversion dam 100 ft. high will create a reservoir of about 32,500 acre-feet capacity, from which a tunnel nearly four miles in length will convey the water through the mountains to a point about 313 ft. above the Pit River where the power house will be constructed at what is known as Lindsay Flat. The installed capacity here will be 90,500 hp.

Pit No. 4 will be similar in layout to No. 3, two miles below its predecessor. A pressure tunnel from

WATER from Fall River will pass to Pit No. 1 power house through the reinforced concrete intake structure shown above. Each of the three openings will be controlled by a radial gate 20 ft. high and 10 ft. wide. A highway bridge spans the canal over the gates. A portion of the circular section of the two-mile tunnel through Saddle Mountain, prior to being lined with concrete, is shown on the left. The view below shows Pit One power house shortly before completion. This building is 42 ft. wide, 135 ft. long and 82 ft. in front elevation. A tailrace 1,200 ft. in length leads to the river.

AFTER passing through the intake gates shown on the opposite page the water from Fall River is conveyed by an open canal of 1,800 cu.-ft. per second capacity to the east portal of the tunnel, shown above. The canal is 30 ft. deep with sloping sides. Most of the tunnel is of horseshoe shape similar to the view shown on the right, approximately 16 ft. high and having a bottom width of 13 ft. The concrete lining is 15 in. thick. The 35,000-kw. generators, shown below in the process of installation, are the second largest of their kind in the world. The plant will contain two of these units with a capacity of 93,300 hp.





An artist's conception of an airplane view of the Pit River Development

three to four miles in length will lead directly from a diversion dam and reservoir to the power house where the installed capacity will be 107,200 hp.

Pit No. 5, the Big Bend project, will be the largest of all. The installed capacity will be about 254,600 hp. The completion of a seven-mile tunnel, which is the major engineering project, is estimated to take about five years.

A World's Record in Transmission

The transmission of voltage at this high pressure has been determined to be the most economical method by which the large block of power generated may be transmitted to its point of utilization. The distance is approximately 200 miles; the amount of energy to be transmitted will ultimately be in the neighborhood of 600,000 hp. Investigations were made based upon the following facts: As the length of the line is increased, a higher voltage is desirable, since the line loss is directly proportional to the length of the line and increases as the square of the load carried. That is, if the voltage is kept constant on a given line and the load doubled, the line loss will be four times that of the first case. Nothing is gained by increasing the size of the wire beyond a certain point, as there is a point beyond which, with a given frequency, voltage and length of line, an increase in the size of the conductor will not increase the capacity of the line. It was found that at a voltage of 165,000, a single circuit would be able to carry 67,000 kw. and at 220,000 a single circuit would be able to carry 120,000 kw., or 160,000 hp. at a loss of not over 8 per cent. Therefore, it would be more economical to build the two-circuit lines to carry the 600,000 hp. which would be generated at Pit River at 220,000 volts, than to build eight circuits for transmission at 165,000 volts, or sixteen circuits at 110,000 volts. The number of circuits in each case allows for some reserve capacity.

Solving the Transportation Problem

From the time construction was first undertaken on the Pit River development, transportation was the most troublesome problem, due to the fact that for

several months of the year snow and mud rendered the roads over the mountains practically impassable. During these months only the most necessary supplies were hauled for thirty-five miles on wagons or sleighs from Bartle, terminus of the McCloud River railroad, to the construction camps, where work remained almost at a standstill.

The only adequate solution of the transportation problem was determined to be a standard gage railroad. During the winter of 1920-21 a survey was made from Bartle to Pit No. 1 power house site. This route was direct as well as feasible, for it furnished a short connection to a central distributing point on Pit River and insured a tonnage large enough to absorb the expense of railroad construction.

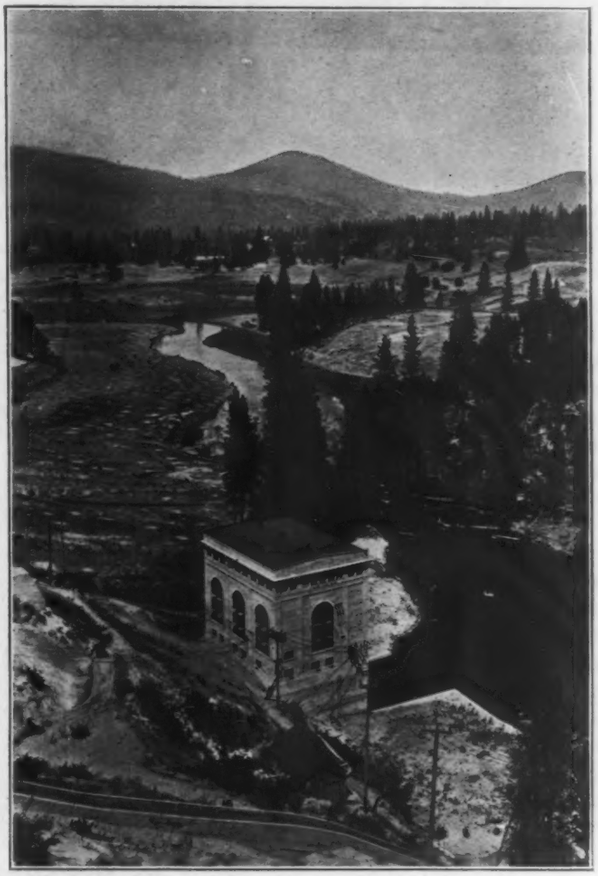
The route of the railroad, 34½ miles in length, was cleared of heavy timber, a roadbed had been graded, trestles and culverts built, and the track completed to Pit One power house site in 120 days. The road was built with 4 per cent maximum grade and 15 per cent maximum curvature.

As the road neared completion, a well planned construction camp for 500 men was erected at its terminus, and another for 150 men was built at the intake of the project, near the town of Fall River Mills. Warehouses, platforms, side tracks and other serviceable terminal facilities were provided for the quick and economical unloading, housing and distribution of materials and supplies.

Since the road has been in operation, only minor interruptions to traffic have occurred. Without the railroad only a small percentage of this tonnage could have been hauled and, this at excessive cost. Construction progress without the railroad would have been negligible; with it, very substantial progress was effected.

Community Center Is Notable Feature

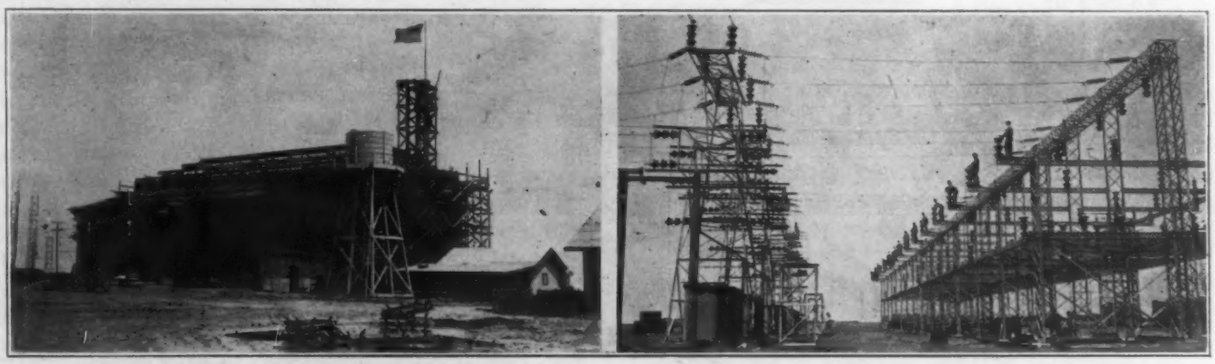
A notable feature of the Pit River development is the establishment of a community center. It consists of a large club house in which it is proposed to take care of all single men, guests and work crews; six cottages for the men with families, four of these having four rooms and two having five rooms, a large garage, warehouse and post office. The club house will be the central building of this community and, also, the center of the social activity of the four plants within a few miles' radius. All of the appointments of the club house and cottages are modern in every particular. Recreation facilities for the employes residing in this comparatively isolated region have been provided and water, fire protection, sewer and lighting systems installed.



This view from Hat Creek No. 2 power plant gives an idea of the wide valleys and winding streams characteristic of the Pit River region.

Remarkable Engineering Achievements

When the water is first turned into the giant turbines, which are the second largest of their kind in the world; when energy is transmitted through

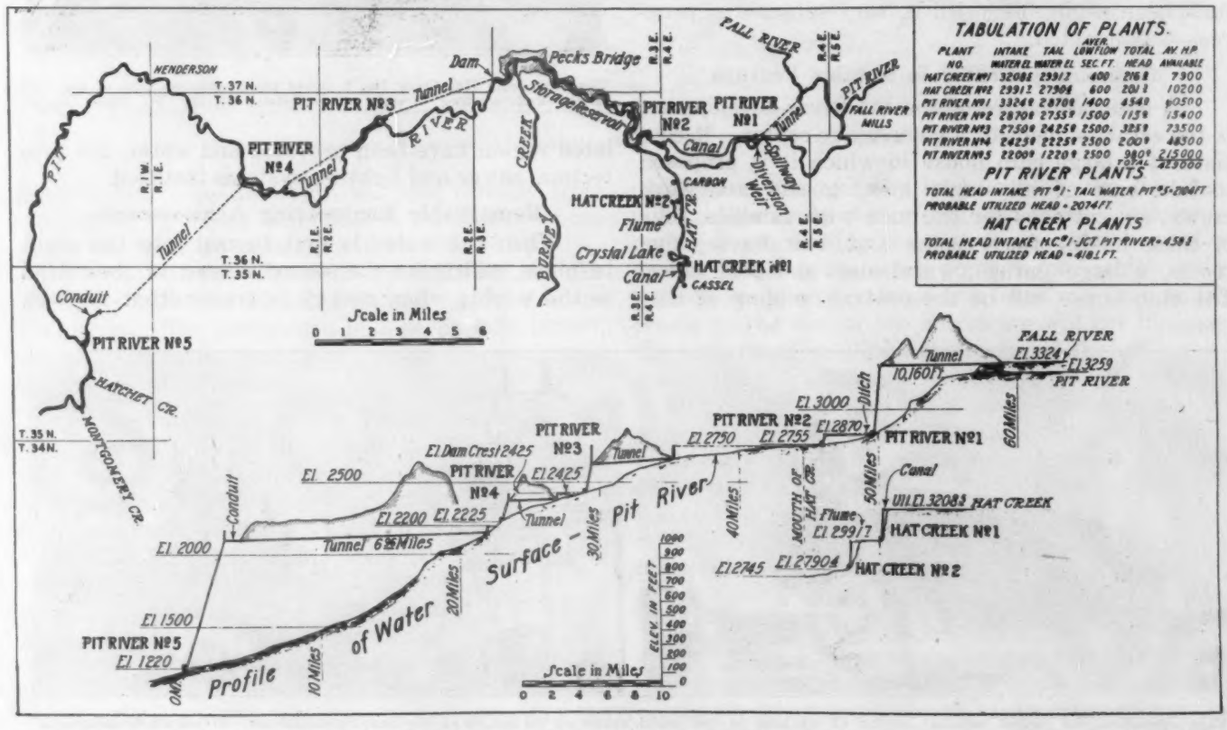


Vaca substation, the largest terminal station of its kind in the world, shown on the left, is rapidly nearing completion. Step-down transformers and synchronous condensers will be installed here. Note the workmen standing on the cross-members of the bus structure on the right.

The men responsible for conceiving and carrying through the Pit development are shown above. John A. Britton, vice-president and general manager, is standing on the rear of an excursion train which recently conveyed a party of California editors to the Pit region. On the right Wigginton E. Creed, president of the Pacific Gas and Electric Company, is shown in front of the clubhouse. In the central picture the following are shown, reading from left to right: Top row—Grover Green, field engineer; John A. Britton, vice-president and general manager; W. E. Creed, president; E. H. Hatch, resident engineer. Lower row—James Martin, superintendent of construction; J. P. Jollyman, chief of division of hydroelectric and transmission engineering; O. W. Peterson, engineer of general construction; A. H. Markwart, vice-president in charge of engineering, and P. M. Downing, vice-president in charge of electrical construction and operation.

the copper wires, part of the largest single order of copper ever placed, at the world's record of 220,000 volts, to the largest terminal substation in the world at Vaca, there to be distributed to farms, homes and industries, California will have added another page to her volume of achievements in hydroelectric development.

When the tremendous block of power which will be developed on the Pit River, equivalent to the work of one million laborers a day, is delivered into the interconnected transmission system of the state, the future agricultural and industrial growth will be insured for years to come. For every time one horsepower in power plant development in the mountains is connected to any one of the giant transmission lines of the West, it means that twelve acres of unproductive land worth three hundred dollars will have applied to it four horsepower in motors for irrigation and general use, producing one thousand dollars in new crops per year, thus increasing the original value of the land from three hundred to an average value of twenty-four hundred dollars. To industry, it means that for every time twenty-five horsepower is harnessed in the mountains, an average of a factory and a half starts up in one of the great cities of the West—involving a capital investment of almost one hundred and fifty thousand dollars. This sets in motion a hundred horsepower in motors, turning the wheels of industry and providing employment for from thirty-three to thirty-four more people and producing over two hundred thousand dollars in new commodities.



Map and profile of the Pit River Power Development

The Purpose and Problems of 220,000-Volt Transmission

Why Transmission of Energy at 220,000 Volts, Which Represents the Greatest Advance of Proven Practice That Could Be Considered Conservative Was Chosen For the Pit River System

By J. P. JOLLYMAN
Electrical Engineer, Pacific Gas and Electric Company

IN undertaking the development of the Pit River the Pacific Gas and Electric Company was confronted with the problem of transmitting the very large amounts of power involved. The power from the initial developments would be required in the San Francisco Bay regions since this is the district containing the major portion of the Company's load. The amount of power to be transmitted would be nearly 100,000 kw. for the initial development and about 450,000 kw. for the complete development. The primary transmission would have to be about 200 miles in length and the secondary transmission from a central receiving point to the load centers in the San Francisco Bay district would be 40 to 50 miles.

The Company had 110-kv. lines in operation and the operation of lines up to 160 kv. have been proven by actual use, while 220-kv. transmission was being discussed by engineers as a possibility. The apparent possibilities of 220 kv. lead to a very careful study of the possibilities and limitations of transmission circuits over a wide range of voltage. The general characteristics of a 200-mile 60-cycle circuit for voltages up to 440 kv. are shown on the accompanying chart. The most important facts shown by this chart are:

(1) The capacity of the circuit increases with the square of the voltage.

(2) The per cent of lost power decreases as the voltage increases.

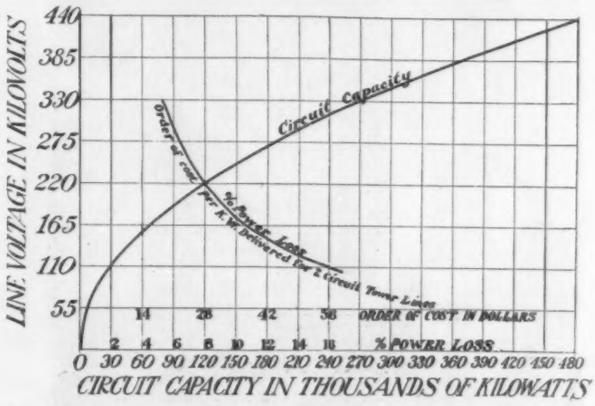
(3) The cost per kilowatt transmitted decreases as the voltage increases.

Another important factor not shown on this chart is the increase in the kva. of the line charging current which is in proportion to the square of the voltage.

220,000 Volts Proves Best

The important question to be decided was how high should be the voltage of the Pit transmission. It was decided that 220 kv. represented the greatest advance of proven practice that could be considered conservative. Furthermore, the amount of power which one circuit could transmit fitted the development program very nicely. It was felt that a spare circuit for at least the average load should be had at all times. A double circuit line would therefore provide a spare circuit for the initial development and two double circuit lines would give a spare circuit for the ultimate development. To have undertaken a still higher voltage would not have been conservative nor would it have given a number of circuits sufficient to insure reliable and convenient operation. Another factor in determining the line voltage was the question of the sizes of generating units required to handle the line charging current. A 200-mile 220-kv. 60-cycle circuit requires a unit of 35,000 kva. to charge the line and deliver a normal voltage at the receiving end. Such a unit is about as large as is desirable for installation. At a line voltage of 275 kv. the charging kva. would be about 55,000 and this would require a unit of larger capacity than would be desirable in any except the last of the Pit plants projected.

The advance in the art of transformer and switch design removed any doubt of the entire feasibility of apparatus of this character for operation at 220 kv. It was realized that the transformer units should be of large capacity and that the oil



Curve showing the economics of high voltage transmission for 200-mile, 60-cycle circuits

switches would be large and expensive. However, comparatively few units would be required.

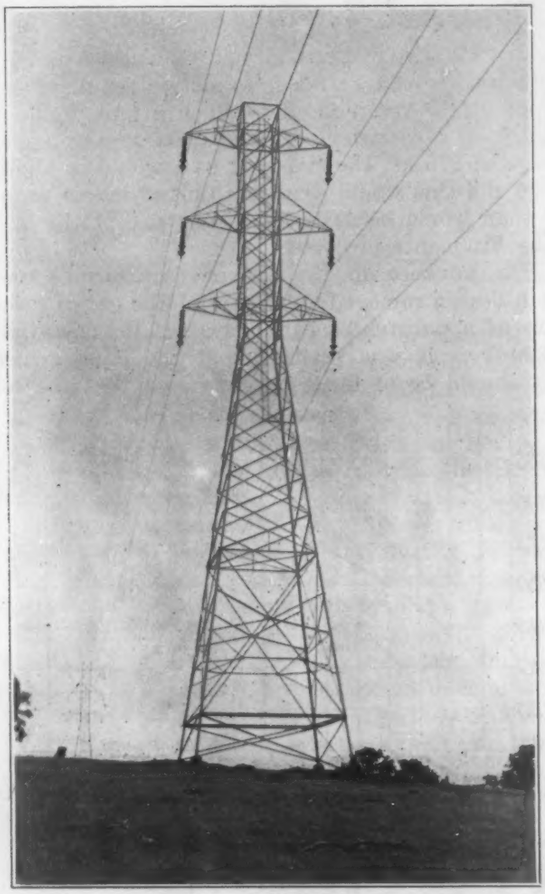
Technical Problems Encountered

The principal technical problems encountered in designing the 220-kv. transmission reduced themselves to the problems in connection with the transmission line itself. The most important electrical problems relate to corona discharge from the conductors into the air, the design of line insulators and the voltage regulation of the transmission circuit.

The problem of corona arises from the fact that if a high voltage is impressed upon a very small conductor there will be a discharge of electricity into the air surrounding the conductor with a loss of energy. This discharge is called corona and has the appearance of very small flames shooting out of the wire into the surrounding air. Corona may be avoided for any given voltage if the size of the conductor is made sufficiently large. For 220 kv. the conductor size required is eight-tenths of an inch in diameter or larger.

Some of the problems relating to corona and to the line insulators can perhaps be better understood

if a comparison is drawn between an electric transmission system and an hydraulic transmission system where the energy is conveyed by means of water under exceedingly high pressure. For example, the water arrives at our Pit No. 1 Power House in two pipes 8 feet in diameter under a 190-pound pressure.



Standard transmission tower on the 220-kv. transmission lines of the Pit River system of the Pacific Gas and Electric Company. There are approximately 142 miles of this type of tower, which measures 62 ft. to the lower cross-arm, with 15 ft. of vertical separation of conductors and 24 ft. between circuits.

If the apparatus in the power house transformed this water into high pressure water and pumped it into three pipes each nine-tenths of an inch in diameter the presure would be about 1,500,000 pounds per square inch. To support this pressure would require pipes of steel having an outside diameter of about 8 feet. This diameter is assumed on the basis that the stress within the walls of the pipe could be made uniform from the center to the surface. As a matter of fact a pipe of this thickness and subject to this pressure made of one piece of steel would have very much more stress near the center than it would near the surface.

Avoiding Corona Losses

When electricity is transformed to a high voltage such as 220 kv. and this voltage is impressed on the line conductors, electrical stresses are set up in the surrounding air somewhat similar to the mechanical stresses set up in the wals of the steel pipe. Corona may be likened unto a cracking of the walls of the tube of the pipe outwardly from the center due to the excessive stresses set up in the material at this point. The line insulators which must be used to support the conductors are subject to the voltage impresed on the line. The electrical stresses which the insulators must resist can be better appreciated by returning to our pipe analogy for a moment. Imagine holes bored into the center of the pipe and then plugged. The plugs must resist the enormous pressure which tends to blow them out. The insulator is like an electrical plug in an electrical hole in the air. The electrical stresses do not tend to force the insulator away from the conductor but there is a strong tendency for a leakage of electricity through the insulator and along the surface of the insulator. The insulators must withstand these stresses under all conditions of weather, whether it be fair or stormy. They must not permit an excessive leakage of electricity over their surface when the surfaces of the insulators have become covered with dust and dampened with fog or light rains.

Design of Initial 220-Kv. Insulators

The insulators must also contend with the tendency to concentrate excessive voltage stresses on the portion of the insulator next to the conductors even as the walls of our pipe have to contend with the tendency for excessive stresses to be set up near the hole through the pipe.

The selection of suitable insulators for 220-kv. transmission has been made the subject of a very thorough investigation in which we have had the hearty cooperation of the manufacturers of insulators. The result has been the selection of improved types of insulator units for use in the string of insulators with which the transmission is being equipped. For the initial installation four special units are used next to the line conductor and nine standard ten-inch units are used in the balance of the string. A combined splash-plate and corona shield having much the form of an insulator with a total diameter of sixteen inches will be used between the conductor and the first insulator. It is not intended that this assembly will constitute the final 220-kv. insulator. Efforts are being made to develop insulator units which individually will have even higher

Synchronous condensers prior to installation at Vaca substation. These condensers, rated at 20,000 kva. at 1,050 amperes, 11,000 volts, 600 r.p.m., are of the horizontal type with revolving field.

capacity to resist leakage and flashover than any units thus far produced. Should success attend this effort, it seems probable that one or two such units would be inserted in the string next to the conductor.

Large Generating Units Required

The control of the voltage of a 200-mile 220-kv. transmission presents a difficult problem. In the first place, a very large generating unit is required to bring the line up to voltage. In the case of the Pit transmission the 35,000-kva. generators which are being installed in our Pit No. 1 power plant are about the smallest generating units that should be used with a transmission of this voltage and length.

A 220-kv. circuit could not carry 120,000 kilowatts without an excessive variation in voltage between the generating and receiving end unless the voltage at the receiving end is controlled by synchronous condensers. A synchronous condenser functions in relation to a transmission line very much as a bearing functions on a shaft. The shaft transmits energy by means of the turning forces applied, but it must be supported at intervals by bearings or else it will bend to such an extent that its ability to transmit power will be greatly reduced. The synchronous condenser supports the voltage of the line and permits the line to devote its attention to the transmission of energy. By so doing the cost of transmission is reduced because the increased capacity gained in the line more than offsets the additional cost of the synchronous condenser. It has been estimated that the cost of the Pit transmission with synchronous condensers is approximately three-fourths of the cost that would have been incurred if they had not been used.

Synchronous Condenser Effects Savings

An illustration of the purpose and economy of the synchronous condenser as an auxiliary to high tension transmission is shown on the accompanying chart. The figures given for the electrical transmission relate to a 161-mile 125-kv. circuit but are illustrative of the benefits to be derived from the use of synchronous condensers on the 220-kv. circuit.

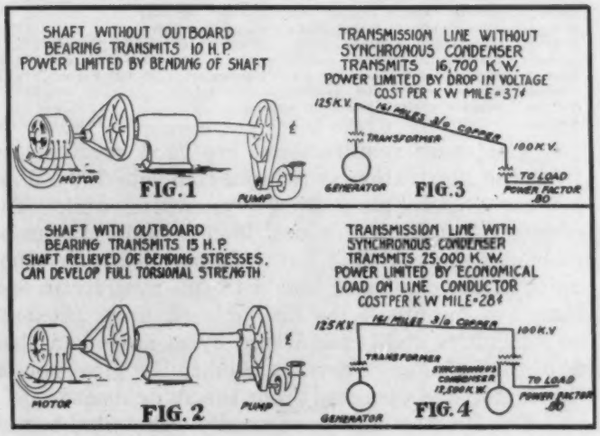
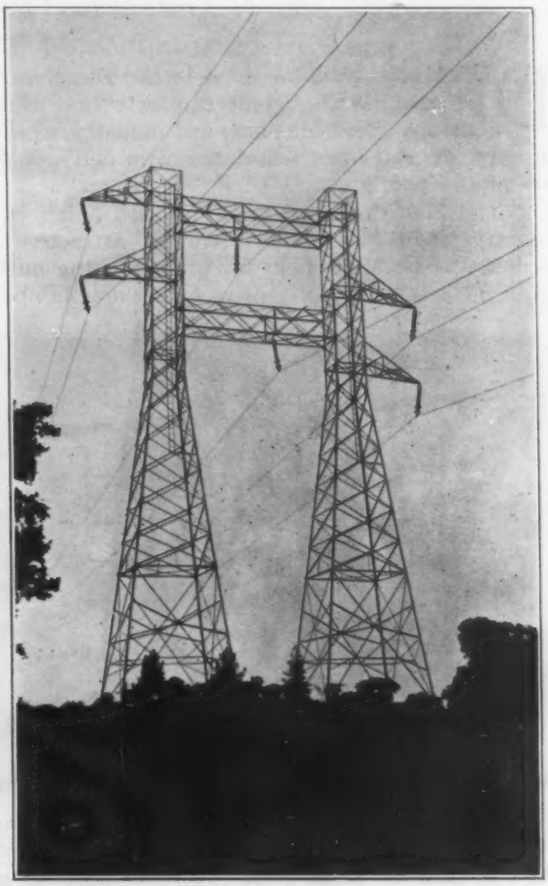

SHAFT WITHOUT OUTBOARD BEARING TRANSMITS 10 H.P. POWER LIMITED BY BENDING OF SHAFT
MOTOR
PUMP
FIG. 1
TRANSMISSION LINE WITHOUT SYNCHRONOUS CONDENSER TRANSMITS 16,700 K.W. POWER LIMITED BY DROP IN VOLTAGE COST PER K.W. MILE = 37¢
125 K.V.
161 MILES 3/0 COPPER
TRANSFORMER
100 K.V.
GENERATOR
TO LOAD
POWER FACTOR .80
FIG. 3
SHAFT WITH OUTBOARD BEARING TRANSMITS 15 H.P. SHAFT RELIEVED OF BENDING STRESSES, CAN DEVELOP FULL TORSIONAL STRENGTH
MOTOR
PUMP
FIG. 2
TRANSMISSION LINE WITH SYNCHRONOUS CONDENSER TRANSMITS 25,000 K.W. POWER LIMITED BY ECONOMICAL LOAD ON LINE CONDUCTOR COST PER K.W. MILE = 28¢
125 K.V.
161 MILES 3/0 COPPER
100 K.V.
TRANSFORMER
SYNCHRONOUS CONDENSER 12,500 K.W.
TO LOAD
POWER FACTOR .80
GENERATOR
FIG. 4

Chart showing the mechanical analogy for a synchronous condenser on the end of a transmission line.

Two hundred and twenty kv. transmission has not heretofore been used because the amounts of power which it has been desired to convey over one circuit have not been sufficient to justify the expense. As has been stated heretofore, the capacity of a 220-kv. circuit is from 120,000 to 140,000 kw., and when loaded to this extent the cost per kilowatt-mile is less than if a lower voltage were employed. However, the total cost in dollars per mile for a 220-kv. transmission is about double the total cost per mile for a 110-kv. transmission. The amounts of energy which we have heretofore been required to transmit have not been so great as to require the 220-kv. transmission. Furthermore, we have not had the opportunities to install the very large generating units which are required in connection with the 220-kv. lines.



Standard transposition towers which are placed at approximately eighteen-mile intervals on the 220-kva. lines of the Pit River system of the Pacific Gas and Electric Company. These towers are formed of two standard towers, with extra long cross-arms, and measure 35 ft. between the centers of the towers.

The economic advantage of the development of 220-kv. transmission is extremely important. The further development of large amounts of hydroelectric power and its economic transmission to the points of use is made possible. The value to a community of hydroelectric power delivered at a low cost is almost inestimable, thus 220-kv. transmission insures a continuation of low cost energy for many years to come.

The Diesel Engine in Isolated Districts of the Southwest

Economies of Operation Alike in Space, Fuel and Attendance Make the Diesel Engine an Important Factor in the Industrial Development of the Southwest as a Forerunner to the Later Development of Water Power

By A. A. TACHELLA
Busch-Sulzer Bros., San Francisco

DUE credit must be given to the Diesel engine, for making the great comforts that electric current offers for home and industry, available at very low rates to the isolated town and industrial or mining plant.

The Southwest with its isolated and medium capacity industrial centers, and its attractive fuel prices, has been the field for an increasing number of such installations whose records show an operating cost that compares quite favorably with the cost of the largest steam central stations.

750-B.h.p. Busch-Sulzer Diesel engine, installed in 1921 in the city of Palo Alto, California

Being a self-contained unit, the Diesel engine lends itself to great advantage for installations in communities or districts not yet reached by the hydroelectric system. On account of the low price current available these communities will develop much more rapidly and later when the power demand has been increased, construction of feed lines from hydroelectric systems is made possible.

Diesel engines economize in space, fuel and attendance. They start any time at a moment's notice, and will assume a load immediately. While their economy is greatest at full rated capacity, they maintain their efficiency to a very remarkable degree through a very great range of load—the same approximate efficiency obtaining from ½ load to 10% overload, assuring great economy at all loads likely to be met with under commercial conditions.

So far as the life of the Diesel engine is concerned, it may be pointed out that there are now engines in this country that have seen daily service for seventeen years, having been rebored but once, which are working today with the same economy as when installed.

The operating record of a 30 day non-stop run with a 520 Brake Hp. Busch-Sulzer Diesel engine at the plant of the Tucson Gas, Electric Light & Power Company, Tucson, Arizona, is given below. The engine during this time was working under ordinary field load conditions, but due to the high economy of the Diesel at various loads, an average output of 11.15 kw-hr. per gallon of fuel or 468.3 kw-hr. per barrel was obtained.

A closed cooling water system is used in this plant, that is, the engine circulating water is cooled in a condenser by native water which in turn is cooled by tower. In the table below the amount of makeup water for both systems is given. The record of cooling water consumption will be of great interest to interior plants where the water problem for a power plant is often a very difficult one.

Summary of 30-day, Non-stop Run of 520-hp. Engine at Tucson Gas, Electric Light and Power Co., Tucson, Ariz.

Normal capacity of engine at Tucson (2,400 ft .alt.)	498 B.h.p., 335 kw.
Test started	6 p.m. Dec. 24, 1919
Test finished	6 p.m. Jan. 23, 1920
Maximum load on engine	330 kw.
Minimum load on engine	120 kw.
Total kw-hr. output	191,590
Total gallons fuel oil used	17,174
Average kw-hr. output per day	6,386.33
Average gallons fuel oil used per day	572.46
Average hourly load in kw.	266.09
Average hourly fuel consumption in gallons	23.85
Average gallons fuel oil used per 100 kw-hr.	8.96
Average kw-hr. output per gallon fuel oil	11.15
Kind of fuel	Calol 24 Be.
Cost of fuel oil f.o.b. Tucson, per gallon	$0.068
Average fuel cost per kw-hr.	$0.00609
Lubricating oil-bearings and cylinders	Texas "Ursa"
Lubricating oil-air compressor	Borne & Scrymser No. 1
Total gallons "Ursa" oil used	90.5. Average per day, 3.016
Total gallons B. & S. No. 1 oil used	3.0. Average per day, 0.1
Average temperature of bearing oil	in, 106 F.; out, 118 F.
Average gallons makeup engine cooling water per day	29
Average gallons makeup tower cooling water per day	3,630
Average temperature cylinder jacket cooling water	in, 83° F.; out, 120° F.
Average temperature piston cooling water	in, 83° F.; out, 120° F.
Average temperature exhaust valve cooling water	in, 83° F.; out, 129° F.
Average temperature exhaust header cooling water	out, 140° F.
Average pressure cooling water to engine	22 lb. per sq. in.
Average pressure cooling water to pistons	21 lb. per sq. in.

The space requirements are very readily seen from the illustration showing a complete 750 B.h.p., 500-kw. Busch-Sulzer Diesel generating unit. The complete weight of this unit is 204,000 lb. It can be started from cold and put into parallel with other units in the plant and loaded to full capacity in less than five minutes . Paralleling such units presents no difficulties and is facilitated by means of an electric speed change device attached to the governor on the engine and operated from the switchboard.

The Diesel engine is especially well suited to raw water ice plants and insures ice at minimum cost, which is of great importance for the refrigeration of fruit and vegetable shipments from California to the East. Such a plant has been installed at Needles, California, of 150 tons daily capacity. The fuel consumption in such size plants varies from 4.5 to 5 gallons per ton of ice produced; in smaller 30-ton plants, 5.5 to 6.5 gallons of fuel are consumed.

Eliminating the Waste in Industry

Shortcuts in Management and New Power Applications Which Have Been Adopted in Western Industrial Plants for Eliminating Waste, Increasing Production and Cutting the Cost of Manufacturing Processes

By LOUIS F. LEUREY
Industrial Electrical Engineer

Chance For Self Education Increases Efficiency

Course of Instruction Offered to Employes by Western Refinery Marks Constructive Step in Industrial Relations

The mechanical department of the California and Hawaiian Sugar Refining Corporation at Crockett, California, has recently launched a most efficient plan to promote self-education among its mechanics of various classes, and by distinctly limiting the objectives to be achieved, has instituted what seems to be one of the most constructive plans inaugurated by any one in recent months.

Under the leadership of the chief engineer of the company and directed by his technical staff, classes in mechanical drawing have been instituted. Each class is limited in number to twelve men so that individual attention of a most efficient character is being devoted to each member. The classes are intended to form a sort of post graduate course, supplementing the night instruction now given by the high school authorities along similar lines and the cooperation is so close between the high school and the industrial plant in this respect that the same basic idea underlies each branch of instruction.

The twelve men in each class are selected from all the candidates applying for the course and the selection is based on priority of application plus a fitness to meet the advanced work being offered.

The purpose of this class is not to make draftsmen, but rather to help the men to express their ideas through the medium of sketches and drawings and to interpret the ideas of others so expressed; also through the work to stimulate their ambitious thought.

THIS DEPARTMENT

will be devoted to a discussion of the various problems of waste in industry as they affect western industrial plants. Readers are asked to aid in the solution of the most vital problems facing industry by sending in accounts and pictures of the various practices for combating waste, which have been adopted in plants with which they are familiar. It is only by thus cooperating with Mr. Leurey that the fullest service can be rendered. Space rates will be paid for all material which is published.

The basic idea behind the course is not to hold out before the applicants a problematical reward in the shape of higher wage but rather to encourage self-development which in the broader sense is its own reward. But it goes without saying that work of this sort cannot but help, in the final analysis, to bring a pecuniary reward which, however, is only incidental to the main purpose.

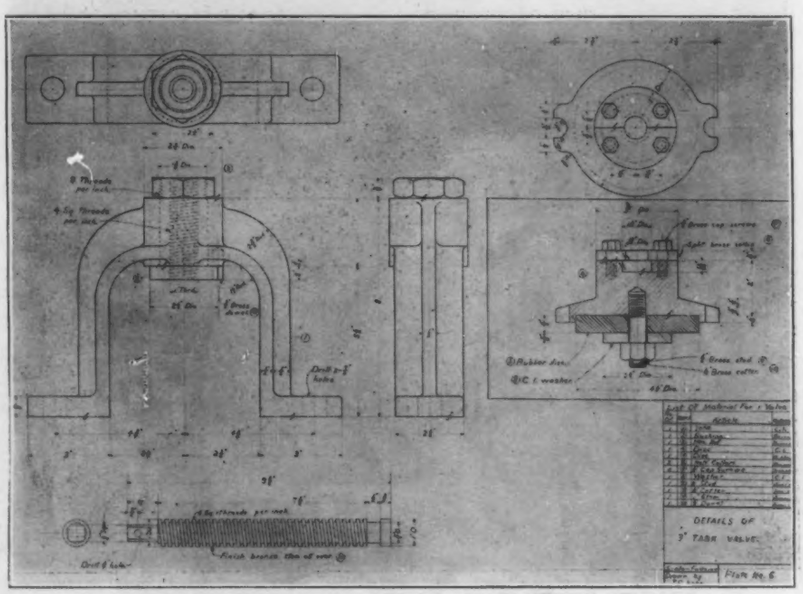
The peculiar efficiency of the classes offered lies in the fact that instead of giving generalized instruction such as is common in the educational field, the men instituting this course recognize that the class of mechanics who are candidates for it have already achieved success as evidenced by their workmanship in the physical handling of many types of machinery, and the whole course is developed around the actual machinery which is being used by these men in the every-day routine duties at the refinery.

The actual component parts of the most frequently used equipment in the service of the refinery is brought into the class room and is jointly dissected by the instructors and the pupils and reconstructed by the pupils on the drawing board under the guidance of the instructor-engineers. The men who are already experienced in the physical handling of the machinery then see it in a new light under the guidance of the engineers who have not only achieved success in the technical line but also in the physical direction of the affairs of a large institution, and thus, to all intents and purposes, the high school post graduate work is being carried on.

The writer had the pleasure of inspecting a number of plates turned out by these men and it would be hard for any one to decide which showed the greater excellence.

By arrangement with the high school authorities who are conducting the night courses, the preliminary work is given in the night classes and the instructors in the night schools are being assisted by the factory engineers in keeping the classes very closely based on the actual work being done at the sugar refinery, for it must be remembered that Crockett is primarily a one-industry town and the great majority of its citizens are directly or indirectly interested in the operations of the sugar refining corporation.

The engineering staff have shown great wisdom in limiting their efforts to a size of class and to a class of work which they can handle with the greatest of efficiency. All of the work is done outside of the regular operating hours of the men and during certain regular evenings, and during other evenings of the week or at a time when they are



A sample of the work done by one of the mechanics of the Crockett refinery of the California and Hawaiian Sugar Corporation in the course in mechanical drawing which the company engineers conduct for the employes. The drawing is a plate depicting a 3-inch tank valve. The subjects of the drawings are taken from the mechanical equipment of the plant and usually represent parts which the employes must frequently handle.

off shift, the drafting room is thrown open to them. All of them have taken advantage of this privilege which shows without a doubt that the work is intensely interesting to them.

The only thing insisted upon by the management is that during the regular instruction evenings of the week, every man must be present unless he is kept away by a serious or unavoidable cause. In this way the men are impressed with the fact that the engineers who are giving up their own time for this work are doing so with a serious purpose in mind, and consequently it would be unfair to the interested men to permit a half-hearted attendance on the part of any individual. In fact, the number of men applying for this class is far in excess of the number who are accepted, and since the first class of twelve men has been inaugurated and taken a certain way in the course a second class of twelve men has been started.

If it proves within the capabilities of the instructors to devote sufficient time to the extension of this work, it is contemplated to extend this idea into the field of simple mathematics, in which again the daily operations of the refinery will be used exclusively as a base for the exemplification of methods of simple calculation.

It would seem that this constructive type of self-education might well be inaugurated in other one-industry towns, or wherever the factory management and its employes are in constant relation with each other, not only during the working hours of the day but in their social contact during the periods of recreation.

Precautionary Measures Protect Against Static Electricity

Upon a general survey in the industrial field, it has been noted that a considerable number of explosions and disastrous fires have been occasioned by sparks due to static electricity. One of the principal fields in which this occurs is in the handling of gasoline, especially from tank wagons.

As a preventive measure, Stephen H. Brooks, president of the Oil Conservation Engineering Company, has suggested the following remedy, which, it is claimed, has proven very successful:

"Take a piece of pipe and drive it into the ground below the frost line and let it extend about 8 ft. high. It should be driven into the ground alongside the gasoline station close to a point where the tank is to be unloaded. Attach to this piece of pipe about a 12-ft. length of iron chain and when the truck drives up to unload throw the chain over the top of the truck tank. This is a very inexpensive piece of apparatus and may be the means of preventing disastrous fires. Some companies absolutely require this and have it installed at all their stations."

Some of the California oil companies have short pieces of chain permanently attached to their tank wagons and allow this to dangle in transit and ready for use as a connection to a permanent ground pipe when arriving at the filling station.

Another field in which explosions due to this cause have proven disastrous is in the harvester machines, particularly in the Pacific Northwest. These machines usually have a long belt drive which permits the accumulation of heavy electrostatic charges. Again, in this case, based upon experience, they have found it necessary to drive ground pipes and lead this static charge to the earth all the while the machines are in operation.

There have been infrequent instances where disastrous fires have resulted from static electricity where gasoline engines were belted directly to various machines. The rapidly moving belts on the pulleys have resulted in charges which have set fire to grease on the engines. In instances such as this the danger of fire can be considerably decreased by keeping the gas engine as clean as possible. Such a procedure is, however, only a half-way measure. Full protection can only be afforded when the moving parts are properly grounded.

Flour mills, starch factories, powdered sugar mills and other classes of manufacture which produce a fine and explosive dust have all experienced to some extent this trouble from static electricity, especially where considerable belting is in service on the drives.

The final remedy in all of these cases is a simple one of providing a good and permanent ground which will continuously, at all hours, remove the static electric charge from the machine parts and belting.

Extensive Maintenance Prevented By Study of Local Conditions

In the industrial field, a great many companies find it necessary to expand their operations and build branch factories in territory far removed from the location of the parent factory. In most of these cases, it is very natural for the parent company to send out an engineer or supervising executive from the home works to design and build the branch factory. In a number of these cases, due to the fact that it has been impossible for these engineers and executives to acquire an intimate knowledge of local climatic and building conditions, expensive failures or high maintenance has been the result.

In one particular case in California, a large hydroelectric development was planned, in which the water was controlled by very large hydraulically operated valves. Due to this lack of knowledge or the oversight of existing conditions, these valves were located in a part of the building which was not heated, and during the winter period the temperature dropped so low as to freeze the water in the hydraulic cylinders and render these valves inoperative. It became necessary, at considerable expense, to improvise temporary heating arrangements throughout the winter period.

In another case during the war period, eastern engineers building a shipyard on San Francisco Bay and not knowing of the extraordinary mild temperature in this locality, incorporated in the design considerable unnecessary expense in the way of providing for interior downspouts for all roof drainage to prevent freezing.

In fact, in this whole field, there is a very considerable waste due to acts of either commission or omission because executives or engineers have not informed themselves completely of local conditions. The remedy, of course, is a very simple one, the only essential being that the supervising engineer or executive should, in all cases, retain the services of a local engineer thoroughly qualified to advise them on all climatic and special conditions obtaining.

PROPER PROTECTION SAVES UPKEEP ON MOTORS

This photograph shows an installation of equipment housed in a dust-proof lean-to at a large California cement plant. This type of installation, which separates all of the electrical equipment possible from the main plant, where a very dusty condition exists, more than repays the cost of the bulk-heading in lower maintenance and continuous operation of the electrical equipment involved.

Western Dealer, Jobber and Agent

Business building suggestions for the store — Distribution and warehousing methods — Advertising and sales promotion ideas

Getting the Crowds to Visit the Home Electric

How Electrical Development League in Northwest Attracted Attention by Judicious Use of Newspaper Space

By R. G. EMERSON

Those readers who have been connected with the planning and operation of a home electrical, or who expect to be engaged in this work, will be interested in an advertising experiment conducted by those in charge of the advertising of a recent home which proved to be exceptionally successful.

"Everett's Home Electrical—
which is the first free exhibit of this nature in the State, and which will be followed by similar exhibits in other cities, represents the co-operative effort of the electrical industry of Snohomish County to present an educational display of a modern home adequately equipped with "Electrical Servants."
Come at least once!"
SNOHOMISH COUNTY ELECTRICAL DEVELOPMENT LEAGUE
1014 Colby Avenue
1:00 to 10:00 o'clock p. m.
June 3 to 11

The appeal in this advertisement was to local pride

If a text book were to be written with the title "Advertising the Home Electrical," somewhere in the forepart of the book should be a cautionary note in large letters reading something like this:

"Whatever is said in this book is the result of careful study of this question by the authors and should be of some value to all who are confronted with the problem of properly advertising the home electrical. However, each community is a separate personality and each home represents a distinct problem. It is necessary, therefore, that the advertising program should be adapted to the particular requirements of the situation."

It was with a similar thought in mind that the advertising committee outlined the publicity and advertising for the Everett (Wash.) Home Electrical. Attractive invitations were mailed to all the consumers of electric energy in the country, fender boards were displayed on the street cars, prominent windows were specially decorated for the week and all civic and social organizations were advised of the exhibit. But the foundation of the campaign was the use of newspaper advertising space.

In planning the newspaper advertising two fundamental principles were kept in mind, the first, that the advertisment must stand out from the rest of the page and attract the reader's attention, and, second, that the copy must be brief and interesting enough to get just one idea into the minds of all who read the advertisement.

The first point was met by the use of distinctive cuts and of sufficient white space to cause the advertisement to dominate the page, even though it was of comparatively small size. This was for the purpose of attracting the eye, as a mass of color in a field of drab monotony will cause all to center their gaze upon it. In order to lead this rather casual glance right into the reading matter it was necessary to catch the mental attention, as distinguished from the visual attention, by a "head" or title which would be in line with their everyday interests.

Assuming that the above sequence would hold true in the majority of cases, the next step was to make the copy itself so brief and interesting as to literally lead the reader right through to

Ladies and Gentlemen:
I am requested to announce that you are all cordially invited to the opening of the
HOME ELECTRICAL
which will be open for inspection for eight days beginning June third.
This is a free educational exhibit of a modern home, adequately and properly wired in accordance with the latest requirements in electrical appliances and illuminating fixtures. It is not an advertising or merchandising display.
Come at least once while the exhibit is open!"
Snohomish County Electrical Development League
1014 Colby Avenue
1:00 to 10:00 o'Clock P. M.
June 3 to 11

This informal announcement emphasized the fact that the exhibit was strictly educational.

the final line telling where and when the home would be held. This latter need, once fully appreciated, was not exceptionally difficult to meet. The advertising man simply hung a placard on his mental wall, reading "Just One Idea at a Time."

These advertisements merely show how the committee used the ideas expressed above in carrying their message to the people of a city of about 40,000 and the surrounding territory.

The advertisements shown on this page are not reproduced as examples of excellent advertisements. Typographically, they are below par. The advertising men on newspapers of smaller communities do not have the experience and capacity as high grade 'layout' artists. This fault is not as seriously detrimental to our purposes as might be expected, however, as the other advertisers in the paper are laboring under the same handicap.

"I'm glad I went, and I'm going again with all the family."
"My wife says I'm missing a lot if I don't go at least once."
"The Home Electrical"
1014 Colby Avenue
1:00 to 10:00 o'Clock p. m., June 3 to 11
"It's a 'business show' for housewives. Go at least once!"

All copy was brief, with plenty of white space, yet action was urged in every line.

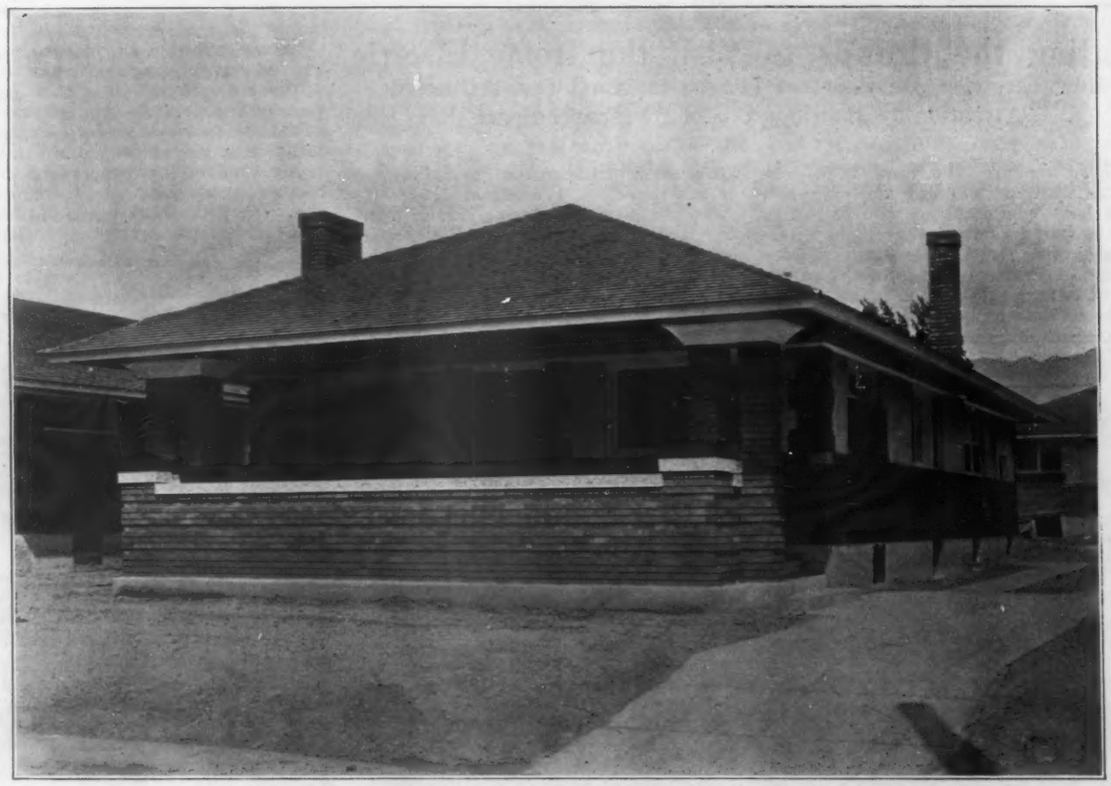
So kindly has the public taken to the Home Electric idea that even the movies are paying the tribute of their attention. A "Home Electric" film is now in process of production, and when it is completed it will be available for exhibition in any community in the country, under the auspices of local electrical and real estate interests.

The film is a five-reel, dramatic picture, and is being made by the Atlas Educational Film Company, Oak Park, Ill. Into it will be woven the story of the actual construction of a house, from beginning to end, including a complete and model wiring installation and a complete equipment of appliances.

Having submitted the idea to real estate boards throughout the country and being promised their full cooperation, the film company plans to put at least ten copies of the picture in circulation simultaneously.

Salt Lake City Electrical Home Highly Successful

Rocky Mountain Electrical Cooperative League Sponsors Home Electrical Which Demonstrates That Moderate Priced Home Can Be Successfully Equipped with Electrical Conveniences Without Excessive Expense



Ten thousand Salt Lake City residents visited the second electrical home to be displayed in that city. The home cost but $6,500 yet it was completely equipped with electrical appliances

The dining room of the home contained one ceiling light, two wall brackets, two convenience outlets and two switches. The electrical equipment displayed consisted of a fan, a waffle iron, percolator and toaster.

The living room contained two ceiling lights, four wall brackets, three convenience outlets and three switches. The equipment consisted of a vacuum cleaner, a floor lamp, a table lamp, and an electric fan.

Second Electrical Home Shown in Salt Lake City

R. W. Butler of the Mine and Smelter Supply Company Joins Home Electric Legion. Twenty Thousand Visit Display

Salt Lake City's second model Electrical Home, a six-room bungalow, built at an approximate cost of $6,500, was opened to the public for a period of two weeks, from July 25 to August 6 inclusive.

In presenting this home for the inspection of the public, the Rocky Mountain Electrical Cooperative League successfully carried out the idea of featuring the extensive use of electrical equipment in the moderate priced home. It was clearly demonstrated that the family of ordinary means could enjoy the comfort and convenience of electrical appliances to a much greater extent than is the usual practice, without the expenditure of a large amount of money for what many have considered luxuries only within reach of the wealthy class.

The home has just been completed as a residence for R. W. Butler, manager of the Mine and Smelter Supply Company, and is located at 1929 South 5th East Street. It contains about 50 outlets and 22 switches. The wiring provides for the following distribution of these outlets and switches:

Front Porch:

1 convenience outlet, ceiling light switch, illuminated house number switch, 2 cornice light switches.

Front Bedroom:

4 wall brackets, 2 switches, 2 convenience outlets.

Bath Room:

1 convenience outlet, 3 wall brackets, switch.

Basement:

4 light outlets, switch.

Hallway, Rear:

2 light outlets, two 3-way switches, 1 convenience outlet.

Rear Bedroom:

2 convenience outlets, 3 wall brackets, switch.

Rear Bedroom:

4 wall brackets, switch, 2 convenience outlets.

Kitchen:

Range outlet, 2 convenience outlets, center light, two 3-way switches.

Dining Room:

1 ceiling light, 2 switches, 2 convenience outlets, 2 wall brackets.

Living Room:

2 ceiling lights, two 3-way switches, 4 wall brackets, switch, 3 convenience outlets.

Approximately 10,000 people visited the home during the two weeks, and all were keenly interested in the story of electricity in the home as they were escorted from room to room by competent guides who explained and demonstrated the uses of the various appliances.

Particular stress was laid upon the fact that in building the modern home more attention should be paid to the electrical installation at the time the plans are made.

While the display in this home was probably not as comprehensive as that of the first one, still there were on exhibition the appliances appropriate to each room of a modern electrically-equipped home; and from a commercial standpoint this was considered of far more value to the electrical industry locally on account of its great appeal to the majority of home builders as something which could be easily applied to any residence of moderate cost.

In the living room was a floor lamp, a table lamp, a 12-inch oscillating fan and a vacuum cleaner (for use throughout the house).

In the three bedrooms were two heating pads, two boudoir lamps, a curling iron, a sewing machine, one violet-ray outfit, one vibrator and one hair drier.

The dining room contained a 10-inch fan, an urn percolator set, a waffle iron and a vertical toaster.

The kitchen was equipped with an electric range, a 6-pound electric iron, an ovenette and a dishwasher.

In the bath-room was a radiant heater and an immersion heater.

The laundry, in the basement, was equipped with an ironing machine, a radiant heater, a laundry iron and a washing machine.

All appliances used in the exhibition were selected by lot, and furnished by the various contractor-dealers and manufacturers' representatives in Salt Lake City.

A particularly striking feature of the exhibit was the absence of any crowded appearance in the display of electric appliances, due to the fact that not too many were shown.

The exhibit was conducted under the auspices of the Rocky Mountain Electrical Cooperative League, with the assistance and cooperation of all the electrical interests in the city. From every standpoint it was decidedly successful.

Window Display and Advertising

By JOE OSIER

Although I understand perfectly that it is much easier to tell men of the industry how to conduct their business and succeed—

Than to make a success of my own affairs,

I take my typewriter in hand for the purpose of informing the readers of this publication what I would do to—

Win a wad—

Were I figuring overhead and worrying about the weekly payroll.

First—I would put my name and business before the buying public and—

I'd keep it there.

To do this, I would decide on a medium of general circulation and buy white space, the same as I would wiring devices, household appliances or anything that I carried in stock. And, every time I got a chance, I'd break into print, in the news section.

Second—I would establish a reputation for high class workmanship and maintain it. I'd advertise speed and service and I would give my customers—

Speed and service—

Or resurrect my sack of tools and get back on the job.

Third—I would brighten up, clean up and dress up my shop—make my windows salesmen—the kind that sell—the kind that cannot be kicked from the front porch or rushed through an office door—

Leading to the street.

I would do all this and more, because, I have found that the men in the selling end of the electrical game who—

Carry the idea under a dented derby that window displays and expensive advertising do not pay are the fellows who bear blisters on their fingers ringing up—

No sale.

They are the men who are always short on Saturday night and who invariably will be found among—

The other bidders were:

Every banker in town knows them—having turned them down on numerous occasions.

By the same token, they are also unfavorably known by every jobber and manufacturer and—

At booster meetings, they are as welcome as a—

Bible tract in a bread line.

For a fact, I have seen electrical shops which reminded me of the home of ol' Tom Morgan—

Or some other town drunkard and—

Without exception, the owner of this ark blatantly told everybody—

Including the world, that—

Any man who let go of real money for advertising and bothered with a window display—

Is a Simple Simon, a witless wight and a candidate for the—

Foolish foundry.

Then, after getting these smart cracks off his chest, this Wisenheimer would stumble over a mess of stock that will never be turned over, finally falling into a dark, evil-smelling office, where he spent the rest of the day peering and pawing over a greasy set of books, trying to figure out why—

In the name of Moses and the beards of the prophets, he couldn't get into the—

Income tax paying class.

Today, the buying public must be catered to. And the business man who is looking ahead will deliberately set out to appeal to prospective purchasers. He knows they want class and he intends to give them class and—

Bill 'em for it.

The business world is moving. Snap into line.

Activities of the West

A Business Man's Department Devoted to Events and Developments in Western Industrial Centers—Including News of Interest to Readers in Public Utility, Industrial and Trade Fields

New Railroad to Utah Mines

Articles Filed for Road to Bring Iron Ore to Proposed Steel Mills

Articles of incorporation of the Carbon County Railroad Company, to construct a railroad 4.79 miles long from the Denver and Rio Grande Western railroad line to the property of the Utah Coal and Coke Company, have been filed in Salt Lake City.

The articles as drawn call for a capitalization of $500,000, and bids on the construction of the line are being received. The road will tap coal and ores which are to be used in connection with the plans of the Columbia Steel Corporation for the development of the steel industry in Utah.

An application for a certificate of convenience and necessity for the road has also been filed with the public utilities commission of Utah, and will be heard on August 15.

Officers of the company include L. F. Rains, president; A. C. Ellis, Jr., vice-president; L. F. Adamson, secretary; W. W. Armstrong and Duncan MacVichie, additional members of the board of directors. All of these men are interested in the syndicate which has formed the Columbia Steel Corporation.

Alaskan R.R. Makes Prospecting Easy for Stampeding Miners

Prospecting without hardship is reported from Alaska when gold was discovered recently on one of the creeks crossed by the Alaskan Railroad. When the discovery was reported, the management of the railroad ran a special train from Anchorage to the scene of the stampede. Instead of mushing across the hills, a large number of prospectors were enabled to visit the scene of the discovery, step off the train, stake out their claims and return to the railroad dining car for luncheon. A lawyer accompanied the special train and looked after the necessary legal matters connected with the new operations. Regret was expressed that an extra baggage car had not been attached, so as to permit the opening of a mining exchange in the evening.

Senator Poindexter's bill providing for an investigation of the Columbia basin irrigation project and authorizing an appropriation of $100,000 to carry on the work, passed the senate on July 11. The bill will be referred to the committee on irrigation of the house, and it is expected that it will be taken up and reported on soon after the house reconvenes on August 15. If the investigation carried on under this bill proves the project to be practicable, it is hoped that government aid may be secured in carrying out the work.

One of the twenty-six homes which are being constructed in St. Francis Wood, San Francisco, which are completely electrified.

Many New San Francisco Homes Are Completely Electrified

Anticipating the prediction made by Duncan MacDuffie, San Francisco real estate man, by three years, there are under construction at the present time in one San Francisco sub-division a total of twenty-six homes which properly fall into the category of homes electrical.

At a meeting of the San Francisco Electrical Development League two years ago, just previous to the opening of the first electrical home in that city, Mr. MacDuffie predicted that within five years the majority of homes to be erected would be completely electrified. At the present time there are being erected in St. Francis Wood, one of the most exclusive sub-divisions in the city, twenty-six homes, none of which have a flue in the kitchen and all of which have sufficient convenience outlets for every conceivable type of electrical appliance.

The illustration shows the home which is being built for Dr. F. Horner Curtiss at the corner of Monterey Boulevard and San Benito Way. It is one of the twenty-six previously mentioned. The home was designed by H. H. Gutterson.

Weekly Pass System Started by Tacoma Street Railways

The weekly pass system, providing for the issuance of a $1 pass, good for any number of rides in one week, with transfer privileges, has been instituted on the street railway lines of the Tacoma Railway and Power Company in Bellingham, and the Puget Sound International Railway and Power Company, in Everett. All concerns are subsidiaries of the Stone and Webster interests. The pass systems were installed when the respective city officials demanded a reduced fare on the street railway lines, and are to be tried out by the public. To date, there has been a very active demand for the passes.

Lumber Company to Build

Plans Maturing for New Electrified Mill For Long-Bell Lumber Co.

The Long-Bell Lumber Company is preparing for the construction of its mammoth mill on the Olympic peninsula between the Cowlitz and Columbia rivers, near Kelso, Wash. A crew of several hundred men is engaged in grading the site for the mill and in constructing a dock 500 feet long and 48 feet in width for handling machinery and equipment. A roadway 60 feet wide is being graded and graveled from the town of Kelso to the mill site.

The Long-Bell Lumber Company is one of the first of the large southern pine manufacturers to enter the Northwest field and it is said that its new mill will be one of the largest and most modern in this section. According to reports the mill will be electrically operated throughout and will have a steam electric generating station of 10,000-kw. capacity to supply power.

Tacoma-Lake Cushman Project to Go to Court for Settlement

The city of Tacoma will take to the Supreme Court in the near future, on appeal from the Superior Court of Mason county, its controversy over condemnation proceedings in connection with the Lake Cushman power site, the development of which is opposed by the fisheries board of the state, on the ground of an invasion of riparian rights.

The decision of Judge Wright of the Superior Court, from which the city will appeal, was to the effect that the hatchery lands are devoted to a specific public use and that as such no municipality can condemn them. What the city wants is the right to divert a part of the water which now flows past the state fish lands on the Skokomish river.

An attempt at settlement between state and city out of court has been unsuccessful.

The water power report of District 4 of the forestry service for the fiscal year ending June 30, 1922, just completed in the office of J. P. Martin, district engineer, in Ogden, Utah, recites that 21 permits for transmission lines, and 29 permits for reservoirs, conduits and power houses were issued by the secretary of agriculture for that district. In addition four licenses for the construction of power plants and transmission lines were allowed. As the district representatives of the federal power commission, the forest service has supervision over the permits and licenses issued by the commission.

Seattle Will Have Two Electric Homes During September

Two electrical homes will be opened simultaneously to the public of Seattle shortly after September first by the Seattle Electric Club. A decided departure from the precedents established in other cities where electrical homes have been displayed is the fact that two homes will be on display at one time. Another feature of the exhibition is that one home, costing upwards of $20,000, has been constructed in the residential district on the south side of the city, while the other, costing between $8,000 and $10,000, will be located in the residential district on the north side. In this manner, it is believed that a greater number of people of various classes will be attracted to the displays.

In deciding to exhibit the two homes, members of the club felt that the same advertising and publicity campaign which would be desirable for one home could be made to serve for two.

The work has been carried on by the Seattle Electric Club through committees composed of members and the duties have bene delegated in such a manner that practically every member of the club is serving in some capacity. The committee in charge of plans and specifications, composed of engineers and contractors, has worked into the plans the best and latest practice in residence wiring. "Elexits" will be used in certain places where it is thought a rearrangement of furniture and furnishings may make the removal or change of lighting fixtures desirable. This applies particularly to the bedrooms.

A decided departure from standard practice occurs in the location of convenience outlets. Instead of in the baseboard close to the floor, these outlets are located at a height of 24 in. to 30 in. from the floor and the plates will be finished to match the interior decorations. Three and four-way switches have been liberally provided. The living room and other principal rooms have been wired with outlets for radio receiving apparatus. Electric stokers for the furnace and electrical heat regulators will be shown. In the larger house selective ringing inter-communicative telephones are being installed.

The electrical fraternity of the city has been enlisted in making the homes as successful as possible. Harry Byrne of the North Coast Electric Company is chairman of the Electrical Homes Committee, which is directing the exhibition of the two homes.

Railroad Commission Prepares New Map of California

Marked industrial development and economic growth are graphically shown in a new map of California, just issued by the State Railroad Commission. The new map is a complete revision of the map issued by the Commission January 1, 1915. The present edition is officially of January 1, 1922.

Unusual effort has been directed toward making this map complete, and accurate as to boundary lines, township and range lines, locations of cities, towns, waterways, mountain ranges and peaks. Railroads and other transportation facilities have been given particular attention and the complete state highway system, compiled from data furnished by the Highway Commission, is shown.

In addition to the large map of the state, there are insert maps of San San Francisco and vicinity, Los Angeles and vicinity, San Diego and vicinity and the city of Sacramento. These are on a larger scale of three miles to the inch, except Sacramento, which is on a scale of 4,000 feet to the inch and contains much detailed information. The street railways in these principal cities have been very carefully shown, together with many other features, notably municipal boundaries of all cities within the insert.

Copies of the map may be obtained from the commission, 870 Market Street, San Francisco. The price is $2.50 on heavy bond paper unmounted and $3.50 mounted on linen. Money order, check or draft should accompany the order for the map.

Underground Water Supply Found By Idaho Irrigationists

Hundreds of acres of high class land near Hamer, Idaho, are being developed by water from artesian wells which are being sunk near natural lakes.

The wells are sunk 10 feet apart, in some instances, and new wells do not diminish the flow of former ones. The necessity for sinking these wells developed from the fact that there was not sufficient water from the original project to cover all the land.

At present there are five wells, flowing about 2,000 gallons of water perminute. Others will be sunk as conditions demand. The flow from the wells is lifted by an electrically-driven pump about 10 feet, from which lift it flows by gravity to the land reclaimed.

It is expected that hundreds of acres of land will be brought under reclamation through this process.

The federal government is conducting a survey of the section to determine the source and extent of the water supply.

Banquet Introduces New Range to Northwest Dealers

The Edison Electric Appliance Company was host to seventy-five members of the electrical industry in Portland on the evening of July 12, at the Multnomah Hotel, where an elaborate dinner was served. Miss B. E. Galvin, home economist from the Edison Electric Appliance factory, introduced the new Hotpoint Hughes Super-Automatic electric range, in advance of the announcement to the general public.

Ray W. Turnbull, Northwest representative of the Hotpoint Hughes line, called attention to the many unique features of the new range and concluded by giving an excellent sales talk on electric ranges. In a few brief remarks A. C. McMicken, sales manager of the Portland Railway Light and Power Company, stressed the necessity of every one who tries to sell electric ranges, first being thoroughly sold on the idea of electric cooking themselves, and to this end each one should have an electric range in their own home.

SEATTLE ELECTRIC CLUB HAS SUCCESSFUL PICNIC

Approximately 300 members of the electrical industry of Seattle and Tacoma enjoyed the hospitality of the Seattle Electric Club at the first annual picnic of that organization on July 22 at Enumclaw, Wash. In addition to having lunch and supper at the grounds, there was a full program of sports including a baseball game between the jobbers and the representatives of the central stations, dealers and manufacturers, which the former won. 18 to 13. There were also races, a horseshoe pitching contest and a tug-of-war between Seattle and Tacoma. The two views above show the horseshoe contest and the Seattle team winning the tug-of-war. P. M. Cole, of the Economy Fuse Company, was chairman of the committee which staged the outing. It is planned to make the outing an annual event.

Vacation Camp Built For Central Station Employes

Puget Sound Light and Power Company Dedicates Outing Place for Employes on Shores of Lake Kirkley near Seattle

Vacations without cost can now be had by the eight hundred employes of the Seattle Division of the Puget Sound Power and Light Company, following the opening of a summer vacation camp on Lake Kirkley.

Formal transfer of this camp from the company to the employes was made on July 16 by President Alton W. Leonard and D. C. Barnes, manager of the Seattle division, to a committee of the employes headed by William Dick. This committee hereafter will have entire charge of the camp.

The idea of a summer vacation camp for all employes and their families was conceived by Norwood Brockett of the legal department of the corporation and due to his efforts the plan was brought to a successful culmination. The camp has been named Norwood Lodge in honor of Captain Brockett.

The main buildings consist of a combined dining hall and dormitory on two floors, with every convenience afforded, including running water, electric lights and other electric equipment such as a laundry, in which is located electric washers and ironers.

A common lodge, 30 by 60 ft., features a large open fireplace, a wide porch overlooking the lake and an excellent dancing floor. In addition to the two main buildings, there is an open air kitchen with a large hotel range and an open brick oven around which 10 or 15 can cook at the same time without inconvenience. The laundry and the wash room are directly back of the kitchen. Grouped about these buildings are a number of sleeping tents, each in a clump of trees to shade them from the heat of the sun.

The camp itself is built on a promontory extending into the lake and has water on three sides. The front is a fine bathing beach, protected from the sudden plunge into deep water by a boom of single logs lying out from the shore.

The development of these beautiful grounds is only begun. Plans have been drawn for landscaping the entire camp site, leaving the tree clumps which add materially to the beauty of the surroundings. The making of lawns and the construction of a fine tennis court is now progressing.

The company provided the land and buildings with their equipment and carried on the building construction, but the employes did all of the work of preparing the grounds, laying the water mains and installing the lighting and other electrical conveniences.

The establishment of this vacation camp was made possible by the thorough and enthusiastic cooperation of company officials and executive and department heads on the one hand and the employes and their committeemen on the other. It is felt that the first stage of success has been reached with the transfer of actual control to the employes, and with the use of a maintenance fund to be provided annually by the company, that all of their plans for the development of the finest vacation camp and playground to be found anywhere may be carried out and finally realized.

Engineering Service Bureau Plans For San Francisco District

Plans for the establishment of a central employment bureau for engineers in the San Francisco Bay region have been formulated by the committee appointed by the San Francisco Engineering Council for that purpose. The matter has now been referred to the various member societies for further consideration.

The plan provides for the employment of an experienced engineer familiar with the work, to direct the bureau. Continuous follow-up work is planned, with a study of the employment situation and the business situation as it affects the work of the bureau. The following constitution and by-laws are suggested:

1. This organization shall be known as The Technical Engineers' Service Bureau of California.

2. Its membership shall be composed of the engineering societies affiliated with and known as the "San Francisco Engineering Council."

3. The objects of this central service bureau shall be to assist its members (and those not members) in securing positions or employment, to collect and disseminate information of value to the engineer, and to promote in general the welfare of the technical engineering profession.

4. It is understood that the word "members" used in the preceding paragraph shall mean such engineers as are members of or affiliated with the following:

American Society of Civil Engineers,
American Society of Mechanical Engineers,
Pacific Association of Consulting Engineers,
American Institute of Architects,
American Chemical Society,
American Institute of Electrical Engineers,
American Institute of Mining and Metallurgical Engineers,
American Association of Engineers,

and such others as may from time to time be added thereto.

Salt Lake Club Organizes New Industrial Department

The Salt Lake Commercial Club has recently organized an industrial branch, which is to be in charge of Frank C. Murphy. Mr. Murphy comes to Salt Lake City from Kansas City, where he has been assistant industrial commissioner for the North Kansas City Development League.

The purpose of the new department of the Commercial Club will be to advertise Salt Lake City and Utah as an industrial center of the West, to foster home industries and to encourage large eastern manufacturers to establish branch factories here.

The first thing which Mr. Murphy will take up will be an industrial survey of the entire state of Utah, in order to gain material for literature.

Among the information which the new department will gather will be data on city government, public utilities, financial institutions, agriculture, irrigation and drainage, geological resources, traffic, highways, tourist travel, retail establishments, wholesale houses, branch houses, manufacturers, packing houses, grain elevators and produce, labor, housing and cost of living, development of surrounding territory, factory sites and buildings, development of industries in conformity with proximity of raw materials, United States government departments, commercial organizations.

The Puget Sound Power and Light Company of Seattle recently turned over to its employes a large vacation summer camp on the shores of Lake Kirkley. The camp has been named Norwood Lodge in honor of Norwood Brockett of the legal department, who conceived the idea. The two views above show one of the sleeping tents and the lodge, and the combined dining hall and dormitory.

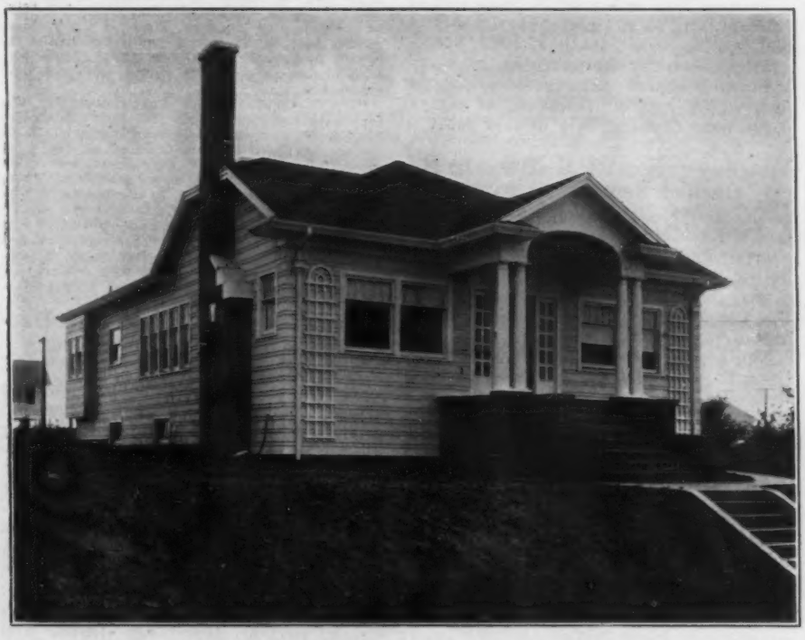
Everett Electrical Home Sets Low Cost Record

Total of 8,500 Visitors See Exhibit at Cost of Approximately Nine Cents Each to Electrical Industry

By H. S. ATWOOD
Puget Sound International Railway and Power Co.

That smaller communities can economically and effectively exhibit homes electrical was proven recently by the cooperative efforts of members of the electrical industry in Everett, Washington. This home attracted a large percentage of the city's residents and was exhibited at an exceptionally low cost.

One of the deterring obstacles in the way of all forms of cooperative effort for members of the electrical industry on the Pacific Coast has been the specter of high cost. The various cooperative organizations engaged in promulgating the electrical idea and the local clubs and associations have realized the problems and have stressed the need for economy at every point. The success of a comparatively small group of electrical men in the Puget Sound city should be of interest to all who are interested in the progress of the campaign to tell the public what electricity really is and what it can accomplish under a system of low overhead.



Electrical home exhibited by electrical industry at Everett, Wash., recently, which was visited by 8,500 people at a cost of nine cents per visitor

The information contained herein is in no way a challenge to other enterprises. It merely represents the result of the concerted efforts of a few enthusiasts—a result expressed in figures which obviously justifies similar cooperative endeavors.

The electrical home attracted approximately 28 per cent of Everett's population. Of a total population of about 30,000, in excess of 8,500 persons visited the display. This high attendance ratio was obtained by means of a carefully planned advertising and publicity campaign. The services of R. G. Emerson, Seattle advertising counsellor, were made available through the cooperative interest of Dean Stephen I. Miller, Jr., of the Northwest Electrical Service League.

The committee in charge decided that there were two principal objectives to be kept in view in order to make the exhibit entirely successful. First of all, the cost of the home should be kept to the minimum consistent with a high type of display. Secondly, the people of the city and surrounding district must be thoroughly advised as to the educational nature of the exhibit and the largest possible attendance of representative residents must be obtained.

The success with which the first problem was met is indicated by the low total cost of conducting the home, seven hundred and forty-seven dollars. The cost was kept to such a low figure through the coordinated efforts of those who planned and operated the exhibit. The committee in charge was composed of H. S. Atwood, Puget Sound International Railway and Power Company, LeRoy C. Jamieson, Press-A-Button Shop, T. H. Erickson and E. A. Jones. On this small group of men fell the duties and responsibilities of conducting the home electrical.

In order to properly solve the second problem, that of attracting the maximum attendance, the bulk of the expense was devoted to advertising which totaled three hundred and fifty dollars. The basis of the campaign was a series of newspaper advertisements run in each of the two daily papers. A folder with descriptive matter about the appliances and containing a model wiring plan and figures regarding the cost of operation of electrical equipment was widely distributed.

In the publicity program, as in the case of the advertising campaign, the newspapers were used as the foundation. The mayor's proclamation of an electrical week, talks before local, civic and commercial organizations, and "write-ups" of the home itself provided material for a series of interest-creating stories.

The members of the committee feel that the success of the exhibit was guaranteed by the simplicity of the program of preparation and operation. Because only fundamentals were considered the primary objects of low cost and large attendance were reached, as evidenced by the per capita cost of the Everett Home Electrical which was less than nine cents. This may be no record in home electrical history but it may serve as the basis for a counter-attack against those who assert that homes-electrical, expositions and similar educational business builders are too expensive.

Utah Power & Light Co. Files on Green River Project

The Utah Power and Light Company has filed application with the Utah state engineer for permission to use 5,000 sec.-ft. and to develop by storage 300,000 acre-ft. in the Green river in Daggett county. With this water it is proposed to develop 188,000 hp. of electric energy for use in Utah, Idaho and Wyoming.

Plans of the company, as indicated from details given in the application, are quite extensive. The filing is in the nature of a protective one to cover rights on which filings were made in January, 1921.

The point of diversion named in the application is in Flaming Gorge canyon, which is just south of the Utah-Wyoming line where the Green River enters Utah.

It is proposed to construct a dam a short distance down the stream, the water from this dam to be backed up well above the proposed diversion point. From the latter point a pressure tunnel 19,800 ft. long would extend, according to the application, in a southeasterly direction, emptying into the Green River again in Red canyon at a point some miles downstream. The pressure tunnel is to be 25 ft. in diameter. It is to deliver water to five wheels, each 66 in. in diameter measured from runner to runner, and of the reaction type. These wheels are each capable of producing 37,600 hp., according to the application, when operated under the proposed head which would vary from 415 to 350 ft.

W. G. Swendsen, Idaho commissioner of reclamation, has approved the formation of the Boise Valley irrigation district. The majority of the land in this district is located in Canyon county. The total acreage in the proposed district is 103,000 acres, and embraces all the land in the Boise-Payette reclamation project not already formed into districts. The purpose of forming this district is to create an operating organization. There are two districts now on the project, the Meridian and the Nampa irrigation districts, embracing 40,000 acres.

Denver Cooperative League Plans For Coming Year Announced

Following a year of activity during which the most important accomplishment was the successful staging of an electrical home, the advisory committee of the Denver Electrical Cooperative League has issued a report covering the progress which has been made by the organization and the plans which have been worked out for the future activities, chief among which is the extension of work into such territory outside of Denver as can be served profitably by the electrical industry of that city.

In reviewing the progress of the League during the first year of its operation, the report emphasizes the following three things:

The establishment of a spirit of mutual helpfulness and understanding within the entire industry.

A marked increase of interest on the part of the public in electrical matters, especially improved wiring plans and their resulting conveniences.

A higher standard and plane of operation for all the component branches of the electrical industry.

In outlining the work which will be undertaken during the coming year, and for which an estimated budget of $20,000 has been drawn up, the report includes the following in its program:

1. The continuation of the educational campaign for the betterment of the industry.
2. The enlargement of the League staff to work with each branch of the industry throughout the territory, and to help in the solution of the individual and mutual problems confronting all members of the League.
3. The development of team work throughout the industry by "get-together" meetings, entertainments and athletic contests.
4. The further development of service to the public through a bureau of electrical information.
5. The establishment of more electrical homes in the most advantageous places in the territory.
6. The development of a course of instruction, lectures, and exhibits on commercial and industrial lighting.
7. The cooperation with builders, architects, city officials and others in the improvement and enforcement of the electrical code.
8. The more general dissemination throughout the industry of information on problems primarily concerning central power stations but which are of vital concern to all.
9. The education of the purchaser of electrical service and merchandise to the value of the League emblem to them, viz:—to indicate that anyone entitled to its use is reliable and responsive, and that it represents the highest class of service, workmanship and materials.
10. The extension of the work of the League to such other territory outside of Denver as can be served profitably to the industry so that every branch of the electrical business will become more closely united for the good of all.

Westinghouse Gets Order From Washington Paper Co.

The Westinghouse Electric and Manufacturing Company has recently received an interesting order from the Washington Pulp and Paper Corporation, Port Angeles, Washington.

The order includes one complete sectional individual motor drive for a 164-inch Bagley-Sewell Foudrinier newsprint paper machine for paper production speeds of 400 to 1200 feet per minute, including a 600 kw. synchronous motor generator set, nine section motors and gear units, and control equipment; three 1000 hp., 240 r.p.m. synchronous motors for driving pulp grinders; one 200 kw. synchronous motor exciter set for pulp grinder motors; one 3330 kv-a., 300 r.p.m. vertical waterwheel type generator with direct connected exciter and one 2700 kv-a., 120 r.p.m. engine type a.c. generator.

The apparatus ordered from the Westinghouse Company will be used for increasing the capacity of the plant, which was built four years ago and is one of the most modern on the Pacific coast.

Building Permits for Denver Show Marked Increase for 1922

A marked increase in building activities in Denver for the first seven months of the current year is shown in a report made public by Frank M. Ladd, city building inspector.

With the addition of the permits issued during the month of July the total for the current year to date is now $10,329,275, which is some $4,600,000 in excess of that for the same period of 1921.

The total amount of the permits issued for the first seven months of 1921 was $5,689,525.

During July this year permits issued total $1,097,275 as compared with $740,850 for the same month of 1921, $365,425 less than for the past month.

Permits issued last month numbered 620, which was an increase of sixty-seven over those of July of last year.

Vancouver Electrical Home to Be Opened September First

The first electrical home to be staged in British Columbia will be opened at Vancouver on September first for a period of three weeks under the direction of the British Columbia Electrical Service League, provided that present plans are carried through.

The home, which is located on Twenty-ninth avenue, half a block west of Granville street, in Shaughnessy Heights, has been built on a cooperative plan, financed by Messrs. Rush and Reed, a contracting firm.

The operation and advertising of the home will be taken in hand by the Electrical Service League of British Columbia.

Before it is thrown open to the public for inspection, the electrical home will be completely furnished and decorated, so as to give the appearance of an ordinary home in use.

There will be 197 electrical outlets of all descriptions—switches, lights, baseboard convenience outlets, etc. The kitchen will be furnished with an electric range, water heater and dish-washing machine, and the laundry with a washing machine, ironing machine and clothes dryer. Intercommunicating telephones and an annunciator system will be installed. There will be outlets for radio sets in the den and living-room.

Another feature will be the master control switch at the bedside in the owner's bedroom, which controls four outside lights and nine inside lights as a burglar alarm.

All closets will be fitted with automatic switches, operating on the door hinges. In every room there will be full equipment of baseboard outlets. Three electric glow logs will be installed in fireplaces.

The electrical equipment, while complete, will not be overdone. In fact, the home will be fitted up in an entirely practical way, within the reach of anyone building a moderately priced house.

It is expected that 10,000 persons will visit the home during the exhibition.

N. E. L. A. President Sees Menace in California Power Bill

In a recent speech before the Twenty-eighth Annual Convention of the Ohio Electric Light Association at Cedar Point, Ohio, President Frank W. Smith of the National Electric Light Association pointed out how the success or failure of the proposed $500,000,000 California Water and Power Act may have a vital effect on the central station industry of the entire nation.

In his address, President Smith said:

"You are all familiar with the proposed California Water and Power Act, on which the voters of the state of California are to be asked to make a decision next November. Recognizing that this proposal was a direct attack against private enterprise, the Association, in contending against the proposed Act, feels that it is not fighting alone for the state of California, but is contending for the rights of every privately owned electrical utility in the country, and in a larger sense, for all private initiative and enterprise, whether it be engaged in public utility work or in private business, for if the state shall seek to socialize one form of business which is being conducted with so much benefit to the people of the great West, as the business of the electric light and power companies is, it will soon reach into other lines of endeavor, with disastrous results to private initiative and enterprise.

"The Water and Power Act proposed in California is patterned after that of the Hydro Electric Power Commission of Ontario. This system has been repeatedly cited as the most successful example of government ownership and operation in the western hemisphere. There has never been any doubt in the minds of persons conversant with the facts that the service rendered by the electric public utilities in the United States under private management and under proper regulation is better, more dependable and less expensive than service rendered by municipally owned or state owned utilities."

Expenditures for Western Harbors for 1922 Announced

Approximately $3,000,000 will be spent on the improvement of western rivers and harbors under the direction of the U. S. Corps of Engineers during the next fiscal year, according to an announcement from Washington, D. C.

During the current fiscal year the Corps of Engineers will expend the following sums on river and harbor projects in the West: Los Angeles Harbor, $500,000; San Francisco Harbor, $10,000; Oakland Harbor, $100,000; Richmond Harbor, $100,000; Petaluma Creek, $50,000; Humboldt Harbor and Bay, $250,000; San Joaquin River, $33,000; Stockton and Mormon channels, $10,000; Sacramento River, $95,000; Yuba River debris, $30,000; Coos Bay, $150,000; Coos River, $3,000; Yaquina Bay and Harbor, $300,000; Columbia River, between Celilo Falls and the Snake River, $12,500; Snake River, $10,000; Clatskanie River, $6,200; Willamette River, above Portland, $27,300; Lewis River, $17,700; Cowlitz River, $11,000; Columbia and Lower Willamette, below Vancouver and Portland, $850,000; Willapa River and Harbor, $265,000; Grays Harbor, $36,000; Puget Sound, $30,000; waterway connecting Port Townsend and Oak Bay, $10,000; Lake Washington ship canal, $40 000.

The Washington Radio Trades Association recently held an organization meeting, when plans of a committee recommending permanent organization were adopted, and the following officers elected: president, Frank U. Bliss; vice-president, C. F. Jefferson; secretary-treasurer, L. C. Warner; executive committee: C. L. Stevens, E. O. Munson and E. P. Denham.

Meetings of Interest to Western Men

Rocky Mountain N. E. L. A. to Meet at Glenwood Springs

The annual joint convention of the Rocky Mountain Division, National Electric Light Association, and the Colorado Light, Power and Railway Association, will be held at the Hotel Colorado, Glenwood Springs, Colorado, on Monday, Tuesday and Wednesday, September 11, 12 and 13.

Chief among the speakers on this occasion will be J. E. Davidson, general manager of the Nebraska Power Company, and vice-president of the N. E. L. A.; Ben S. Read, president of The Mountain States Telephone and Telegraph Company, Denver; P. L. Thomson, general advertising manager for the Western Electric Company; Jas. C. Burger, Denver banker, and others from various parts of the country.

There is every indication that this will be one of the largest, if not the largest convention ever held in the state. It is urged that immediate reservations be made direct from Mr. Lucas, manager of the Hotel Colorado. It is needless to state that Glenwood Springs is one of the most beautiful spots in the state.

Chairman A. C. Cornell and other members of the program committee are perfecting plans for plenty of sport, fun, and amusement for the ladies as well as the men, thus assuring all who attend something more than "all work and no play."

Numerous matters of extraordinary importance and interest will come before the convention this year. Practically every phase of the utility industry will be touched upon by one speaker or another. E. P. Bacon is president of the N. E. L. A. division, while Fred Norcross heads the other association.

The committees appointed, and their personnel, follow:

Program Committee—E. A. Phinney, chairman, Norman Read, W. C. Sterne, C. A. Semrad, V. L. Board.

Transportation Committee—E. A. West, chairman, D. C. McClure, J. J. Cooper, L. M. Cargo.

Entertainment Committee — A. C. Cornell, chairman, B. C. J. Wheatlake, G. E. Lewis, J. C. Davidson, J. F. Greenawalt.

Invitation Committee—H. D. Randall, chairman, J. F. Dostal, W. F. Raber.

Program for Contractor-Builder Convention Announced

The official program for the annual convention of the California State Association of Electrical Contractors and Dealers, which is to be held at Santa Cruz, August 18 and 19, has been announced from the headquarters of the association. The program follows:

August 17

Executive Committee Meeting, 8 p.m.

August 18

10 a.m.—Contractor-Dealer Session.

2 p.m.—Some New Things from the Lighting Field.

August 19

9-11 a.m.—Discussion and Interpretation of the Proposed Electrical Safety Orders.

11 a.m.—State Railroad Commission's General Order No. 64. Presentation by representative of California State Railroad Commission.

1:30 p.m.—Contractor-Dealer Session; election of officers, reports of committees, etc.

3:00 p.m.—Motor Dealers' Session.

6:30 p.m.—All-Together Dinner.

Western Engineer Suggested As Institute Head

The name of Harris J. Ryan, professor of electrical engineering and head of the experimental laboratory of Stanford University, and internationally known electrical engineer, has been suggested as a candidate for president of the American Instititute of Electrical Engineers for the year beginning August, 1923. The suggestion was made at the Pacific Coast Convention of the Institute at Vancouver, B. C., August 8-11. The suggestion received the unanimous and enthusiastic endorsement of all Pacific Coast sections.

Utah Irrigation Congress Holds Fifth Annual Session

The fifth annual session of the Utah Irrigation and Drainage Congress was held at Logan, July 27 and 28. President F. H. Harris of Brigham Young University presided.

At the first morning session Professor Orson W. Israelson of the Utah Agricultural College talked on "The Relation of Irrigation and Drainage," in which special attention was given to the causes and preventive measures of water-logging. Professor Israelson pointed out the undesirability of porous canals and farm ditches, and recommended canal lining and cleaning of ditches.

Joseph R. Murdock, one of the most prominent irrigation experts in the West, gave a ten-minute discussion of "The Future of Reclamation Development in Utah." He pointed out that there are thousands of acres of land in the counties of northern Utah yet to be drained and utilized for agricultural purposes. He also cited instances where good work along this line is now being accomplished in various parts of the state.

W. R. Wallace, of the Utah Water Storage Commission, talked on "The Work of the Utah Water Storage Commission." He explained various plans yet to be put in practice for the storing and saving of water supplies for Utah.

R. A. Hart, Sr., engineer of the western division of the U. S. Department of Agriculture, opened the second day's session with an interesting talk, in which he went into considerable detail regarding the financing of drainage districts, both from the standpoint of the farmer and that of investor. He spoke of the vast amount of work yet to be done in the way of reclamation.

Dr. Joseph E. Greaves of the Utah Agricultural College discussed alkali and non-alkali soils, with special emphasis on the methods of removing alkali and the treatment of soils after the alkali has been removed.

C. G. Adney of Corinne, Utah, talked on drainage. He urged the drainage of land before it goes bad, as irrigated land will surely do sooner or later if not drained.

Dr. John A. Widtsoe, former president of the Utah Agricultural College, called attention to the very great value of utilization of irrigation in this section. "Irrigation must be our hope," he said. "In this connection we must not entertain the thought that our agricultural resources are already utilized. By proper utilization we might increase our yield from irrigation areas by 50 per cent, and might double our irrigation with water we already have."

COMING EVENTS

CALIFORNIA STATE ASSOCIATION OF ELECTRICAL CONTRACTORS AND DEALERS

Annual Convention—Santa Cruz—August 17-19, 1922

SOUTHERN IDAHO ASSOCIATION OF ELECTRICAL CONTRACTOR-DEALERS

Annual Convention—Hailey, Idaho—August 25-26, 1922

ROCKY MOUNTAIN DIVISION, N. E. L. A.

Annual Convention—Glenwood Springs, Colo.—September 11-13, 1922

COLORADO ELECTRIC LIGHT, POWER AND RAILWAY ASS'N

Annual Convention—Glenwood Springs, Colo.—September 11-13, 1922

INVESTMENT BANKERS ASSOCIATION OF AMERICA

Annual Convention—Del Monte—October 7-11, 1922

Everett, Wash., telephone users will continue the use of telechronometers until the department of public works at Olympia has completed its investigation, fixed the valuation of the Puget Sound Telephone Company and determined rates that should be charged for measured talk, according to an order recently entered by the department denying the motion of the city of Everett to discontinue the use of the meters. Telephone subscribers numbering 159 petitioned the department to continue the use of the telechronometers, and the department also found that the majority of subscribers were paying less for the measured service than they had been paying under the old flat rate system, according to data on 60 days' use of the machines.

Dr. William T. McClellan, retiring president of the American Institute of Electrical Engineers, was one of the most active figures at the Pacific Coast convention of that organization at Vancouver where he delivered the presidential address, his last official function. In connection with his visit to the West, he addressed gatherings of engineers and business men at Spokane, Seattle,

WILLIAM T. McCLELLAN

Portland, Salt Lake City and Denver. Mr. McClellan was educated at the University of Pennsylvania with the class of 1900 and received the degree of E.E. in 1913. Following his graduation he was employed with the Philadelphia Rapid Transit Company engaged in all forms of railway and construction work and later became engineer in charge of construction. He left that company in 1905 to go to New York with Westinghouse, Church, Kerr and Company and was later one of the managing engineers of this firm. In 1917 he became associated with H. T. Campion of Philadelphia in construction engineering, which association has been maintained until the present time.

Henry T. Hall of Salt Lake City has assumed the management of the Uintah Light and Power Company of Roosevelt, Utah. For the past eight years Mr. Hall has been associated with the General Electric Company.

C. B. Hall, president of the Illinois Electric Company, has just returned from a month's visit to the East where he took in the National Jobbers' Association and the Westinghouse Agent Jobbers' Association meetings at Hot Springs, Virginia.

A. A. Brown, manager of syndicate operations and assistant to the vice-president of the Westinghouse Electric and Manufacturing Company, recently inspected the Rocky Mountain office of that company on his way to the Coast. On his visit to Salt Lake City he was accompanied by **L. M. Cargo,,** territory manager, and **J. P. Sprunt, Jr.,** head of the supply department of that company, both with headquarters in Denver.

E. D. Stewart, branch manager of the El Paso office, **J. H. Knost,** branch manager of the Tucson office, and **J. H. Fenton,** manager of the industrial department of the Los Angeles office, all of the Westinghouse Electric and Manufacturing Company, are in Salt Lake to attend a conference of the Westinghouse employes who handle mining territory in the West.

Personals

Carl D. Jackson, chairman of the Wisconsin Railroad Commission, and president of the National Association of Railway and Utility Commissioners, paid a visit to Salt Lake City during July.

P. Mathison has recently been assigned to the San Francisco district of the Westinghouse Electric and Manufacturing Company as switchboard specialist. Mr. Mathison has been associated with the Westinghouse interests for fifteen years, entering the East Pittsburgh works in 1903 as an engineering apprentice, after graduating from Toronto University as an electrical engineer. From 1906 to 1912 he was switchboard engineer for the Canadian Westinghouse Company at Hamilton, Ontario. Returning to East Pittsburgh in 1914, he was employed on project work in the switchboard division of the engineering department.

Walter H. Seaver, sales manager of the wire products department of the U. S. Steel Products Company of San Francisco, is in Los Angeles on a business trip, looking after the interest of his department.

O. J. Orear, former manager of the Mason City, Iowa, branch of the Julius Andrae Company of Milwaukee, has recently joined the sales organization of the Illinois Electric Company and will handle the Westinghouse industrial line for that company.

George Hemmon, formerly with the sales department of the B. K. Sweeney Electrical Company, recently resigned his position with that company to enter business in San Francisco.

W. S. Berry, sales manager of the San Francisco office of the Western Electric Company, **Garnett Young,** general manager of Garnett Young and Company, **C. C. Hillis,** vice-president and treasurer, Electric Appliance Company, San Francisco, **H. H. Courtright,** president, Valley Electrical Supply Company of Fresno, **George Bigelow,** assistant general agent, Southern Sierras Power Company of Riverside, **R. E. Fisher,** vice-president in charge of sales, Pacific Gas and Electric Company of San Francisco, and **Robt. L. Eltringham,** manager, California Electrical Cooperative Campaign, were in Los Angeles attending the monthly meeting of the Advisory Committee of the California Electrical Cooperative Campaign.

E. F. Scattergood, chief electrical engineer of the Bureau of Power and Light, City of Los Angeles, has just returned from a five weeks' trip to Washington, where he was a delegate on behalf of the Swing-Johnson Boulder Canyon Bill.

E. E. Valk. Los Angeles engineer of the General Electric Company, has just returned from a six weeks' trip in the East visiting the General Electric Company's factories in Schenectady and other eastern points.

F. H. Ensign of the New State Electric Supply and Fixture Company, Phoenix, Arizona, is spending a month in southern California with headquarters at Long Beach.

E. M. Mackey, manager of the electrical department of the El Paso, Texas, branch of the Mine and Smelter Supply Company, was a visitor at the home office of the organization at Denver recently.

R. E. Caldwell, Utah state engineer, has recently returned to Salt Lake City following a conference in Denver with **A. P. Davis,** director of the United States reclamation service, and **F. W. Weymouth,** chief engineer of the service, over details of the survey of the irrigation and power possibilities of the Great Salt Lake and Dead Man's bench projects. Both the state of Utah and the reclamation service will each contribute $15,000 for further investigation of these projects as the result of a contract drawn up by Mr. Caldwell and the reclamation service officials.

Thomas W. Rolph has been appointed managing engineer of the scientific street lighting department of the Holophane Glass Company, Inc., of New York. Mr. Rolph has been with the company since 1907 with the exception of the years 1913 to 1920 when he was with the General Electric Company.

Gerard Swope, president of the General Electric Company, has just been elected a fellow in the American Institute of Electrical Engineers. Fellowship is the highest grade of membership and is characterized by the stipulation that the president of the Institute is to be chosen only from among the fellows.

M. W. Scanlon has recently been assigned to the San Francisco office of the Westinghouse Electric and Manufacturing Company as director of publicity and sales promotion for northern California and Nevada. Mr. Scanlon received his education at the College of Wooster (Ohio) and the University of Pittsburgh. For three years following his graduation he taught mathematics and science in the high schools of Pittsburgh. Previous to joining the Westinghouse forces he spent six months with the Chevrolet Motors Company.

M. W. SCANLON

He entered the house organ section of the publicity department of the Westinghouse company in October, 1920, and later was transferred to the merchandising section editing "Contact," the company's house organ. He was placed in charge of the merchandising section in December, 1921, and held that position until his transfer to the San Francisco office.

Anson W. Burchard, vice-chairman of the board of directors of the General Electric Company, has been elected president and chairman of the board of the International General Electric Company.

H. D. Shute, vice-president and general sales manager of the Westinghouse Electric and Manufacturing Company, has been elected a member of the board of directors of the Standard Underground Cable Company, Pittsburgh, Pa.

James E. Blackwell, former superintendent of buildings for the city of Seattle, has resumed general practice of architecture and consulting engineering, with offices in the Hoge Building Annex. Mr. Blackwell in his work specializes in power stations, docks and drydocks, and has built a number of important projects in the Puget Sound country.

H. Birchard Taylor, president of the Pelton Water Wheel Company and vice-president of the William Cramp and Sons Ship and Engine Building Corporation of Philadelphia, is in San Francisco visiting the Pelton works. This is Mr. Taylor's first visit to the Pacific Coast and to the main works of the Pelton company since the acquisition of the control of that organization by the Cramp interests. Mr. Taylor is accompanied by **Lewis F. Moody,** hydraulic engineer of the parent concern.

Hylom T. Plumb, of Salt Lake City, has been elected vice-president of the American Institute of Electrical Engineers for the Ninth District. He is also president of the Engineering Council of Utah. Mr. Plumb is intermountain engineer of the General Electric Company at Salt Lake City. He has been with this company for the past twelve years, the first two years of which he spent at the Denver office. Prior to that he was professor of electrical engineering at Purdue University, and at other eastern institutions. As an engineer, teacher, writer and lecturer he is well

HYLOM T. PLUMB

known in this country. He is especially gifted in presenting popular lectures on scientific subjects. Mr. Plumb is a graduate of Milton College and of the University of Wisconsin. He has been very active in Institute affairs, and was general chairman of the 1921 A. I. E. E. convention committee which so successfully handled the Salt Lake City convention.

Oliver Sheba of the engineering department of the Southern California Edison Company, together with a party of business men of Fresno, California, recently conducted an expedition across the high Sierra as a foundation for a campaign for state and national aid to complete the Roosevelt National Highway across Piute Pass, the highest pass in America to be crossed by a roadway.

A. B. Saurman, general sales manager of the Standard Underground Cable Company, Pittsburgh, Pa., has been elected a vice-president of the company and will combine the duties of his new office with those of general manager of sales.

C. J. Blanchard, assistant director of the United States Reclamation Service, was a recent Salt Lake visitor en route to inspect various projects in Idaho in which the government is interested.

George Campbell, general manager of the Truckee River General Electric Company with headquarters at Reno, Nev., has recently visited San Francisco and other California cities.

Frank B. Chapman has recently been appointed eastern sales manager of the Bryant Electric Company of Bridgeport, Conn., succeeding **George V. W. Ingham,** who has resigned. Mr. Chapman's experience embraces nearly thirty years devoted to the electrical industry.

E. A. Sherman, associate forester of the U. S. Forest Service, recently left Seattle for a two-months' trip through Alaska to make a field study of departmental problems. There are twenty million acres of national forest lands in Alaska and Mr. Sherman's trip will take in the greater part of these holdings.

S. W. Bishop, executive manager of the Electrical Cooperative League of Denver, was a member of the reception committee which entertained Hanford MacNider, national commander of the American Legion when he visited Denver July 15th.

A. M. Jackson, chairman of the Rocky Mountain Electrical Exposition committee, is now in the East making a number of calls on the most important manufacturers in connection with the electrical exposition to be held in Salt Lake City, October 2 to 14. His itinerary will include New York, Boston, Philadelphia, Baltimore, Rochester, Syracuse, Buffalo, Pittsburgh, Detroit, Cleveland, Toledo, Dayton, Chicago and a number of towns in Connecticut. During his absence **P. M. Parry,** commercial manager of the Utah Power and Light Company, will act as temporary chairman of the Exposition executive committee.

H. M. Ferguson, manager of the Salt Lake division of the Utah Power and Light Company, has returned to Salt Lake City after a visit of six weeks in New York and other eastern cities.

E. L. Andrew of the publicity department of the Westinghouse Electric and Manufacturing Company, is visiting the principal cities of the West in the interest of a special advertising campaign which his company is desirous of promoting in conjunction with agent-jobbers and contractor-dealers.

William Bradshaw, designing engineer of the Westinghouse Electric and Manufacturing Company with headquarters in East Pittsburgh, Pa., spent some time recently on the Pacific Coast, largely in and about the San Francisco Bay region.

J. C. Douglas, range expert, has been placed in charge of the range, hotel and restaurant equipment department of the Edison Electric Appliance Company, Inc., to fill the vacancy caused by the resignation of **B. Y. Gibson.** Mr. Douglas has had a great many years' experience in the distribution of ranges, having formerly been in charge of the range sales department of the Hawaiian Electric Company at Honolulu. Previous to that time he was with the Pacific States Electric Company at the San Francisco office of that concern. The West, with its abundance of cheap hydroelectric power, furnishes one of the greatest fields for the use of electricity in cooking. Great progress has been made, not only in the introduction of the electric range into the home, but also into hotels and restaurants. In his new position, Mr. Douglas will have charge of the distribution of the Hotpoint Hughes range throughout California, Nevada and Arizona.

J. C. DOUGLAS

C. R. Rudy, formerly sales manager of the Colorado Power Company, has been appointed secretary and sales manager of the Meyer Pulp and Paper Company, an eastern organization which is building a million dollar plant near Denver.

George Lewis, executive manager of the Rocky Mountain Committee on Public Utility Information, addressed the midsummer meeting of the Colorado Editorial Association at Pueblo, Colorado, July 21, and gave a talk on "Advertising Newspaper Advertising."

Obituary

David D. Faris, manager of the marine department of the Westinghouse Electric and Manufacturing Company, died suddenly in his office at the East Pittsburgh works of the company on July 10. Mr. Faris had been with the company since 1904, and had risen from the position of stenographer to departmental manager during that period.

Louis B. Roberts, veteran secretary of the Denver Association of Electrical Contractors and Dealers and a resident of Denver for 43 years, died of paralysis July 31. He was 72 years old.

DISCREPANCY IN PRINTING

The Edison Lamp Works of the General Electric Company, Harrison, N. J., has recently revised and issued a number of Lighting Data Bulletins. The following bulletins are affected: "Maintenance of the Lighting System," "Effect of Color of Walls and Ceilings on Resultant Illumination," "Lighting of Show Windows and Show Cases," "Artificial Daylight in Merchandising and Industry," "School Lighting," and "Calculation of the Lighting Installation."

The Allis-Chalmers Manufacturing Company, Milwaukee, Wis., has just issued Bulletin No. 1123, entitled "Small Steam Turbines." The booklet describes that type of turbine used to drive condenser auxiliaries, exciters and small generators. The text is illustrated with a number of diagrams.

The Western Electric Company's Portland branch will have a new home upon completion of a three story brick building to be erected immediately for its exclusive use at the corner of Park and Flanders Streets. The structure will cost $35,000 and will be ready for occupancy the latter part of August.

The Kyle Electric Company has been incorporated at Pueblo, Colo., with a capitalization of $10,000 by J. S. Cowan, A. M. Cowan and others.

The Electric Maid Shop, of Portland, has moved to new and more spacious quarters on Alder St. between Fourth and Fifth Streets. This shop specializes in household conveniences and appliances and now has a neat and tastily arranged store in the center of the retail district for the display of its goods.

The Cutler-Hammer Manufacturing Company, Milwaukee, Wis., announces that flush type switch and receptacle plates may now be obtained in the Brush Lac finish perfected by that company. The finish looks like brush brass, is neat durable and considerably less expensive. The finish reduces the cost of the plate nearly fifty per cent.

The Poole Electric Company, operating stores in Seattle, Tacoma and Olympia, is opening another store in Aberdeen, with Fred Anderson as manager.

Norman B. Jensen will open a new electrical supply store at Sierra Madre, California.

Edward Zeiher and **Albert Zeiher** are opening a new electrical store at Kemmerer, Wyoming.

Jack Perrin has opened a new store at 104 East Queen Street, Inglewood, California, where a full line of electrical supplies will be carried.

J. B. Caro and **G. L. Madson** are featuring a full line of electrical appliances at 15 Stevens Street, Spokane, Washington.

The Kyle Battery and Electric Co. is reported to have opened an electrical supply business at Pueblo, Colorado with an incorporated capital, $10,000.

The Pacific Electric Company, Inc., Aberdeen, Wash., will open a branch store in Hoquiam. A. E. Hunt is the general manager of the company.

The Western Radio Sales Company has opened offices in the McIntyre Building in Salt Lake City. The company will distribute the products of the Radio Corporation of America, together with Westinghouse and General Electric radio equipment throughout the Intermountain district. Offices will also be maintained in Ogden, Butte, Reno, Boise, Denver and Cheyenne.

Manufacturer, Dealer, and Jobber Activities

The Johns-Pratt Company of Hartford, whose selling arrangements through the Johns-Manville Company were recently dissolved, has established a Pacific Coast branch. This office, located in the Call Building, New Montgomery Street, San Francisco, will be in charge of **A. J. Moan**... Mr. Moan was with Johns-Manville Company for a number of years and is therefore entirely familiar with the Johns-Pratt line of fuses and protective devices, packing and molded insulation. To facilitate deliveries on the Pacific Coast, a comprehensive stock of all lines will be carried at San Francisco.

The F. W. Wakefield Brass Company, Vermilion, Ohio, manufacturers of "Red Spot" lighting specialties, has recently received notification to the effect that Holophane Glass Company of New York has standardized on "Red Spot" hangers for both ceiling and suspension units.

The Sprague Electric Works of the General Electric Company has issued Bulletin No. 48718 describing the Sprague electric dynamometer chassis test for motor car manufacturers, service stations and public garages. The dynamometer also has auxiliary equipment for direct engine testing.

The Killark Electric Manufacturing Company, St. Louis, has perfected a new popular priced radio set which it is preparing to place on the market. The set consists of a tuning coil with sliders, a fixed condenser and a crystal detector. The only additional equipment needed is a ground wire, antennae and head phones. The set will receive messages broadcasted within a distance of 25 miles from the receiving station.

The Brascolite Company Division of the St. Louis Brass Manufacturing Company, of St. Louis, has issued catalog No. 9, describing the various Brascolite fixtures. Also included in the new catalog are descriptions of the more recent Industrolite, Aglite and E-lite. The catalog is most attractively done, a number of the illustrations being in colors. It will be sent to dealers upon request.

The Allis-Chalmers Manufacturing Company has issued Bulletin No. 1124 describing the synchronous motors manufactured by that company. In addition to going into the details of motor construction there are many photographs of actual industrial installations. The bulletin also contains some interesting data on the use of synchronous motors for improvement of power factor.

The Mechanical Appliance Company, Milwaukee, has placed on the market a new line of Watson a.c. multi-speed motors which provide for speeds of 600, 720, 900 and 1200 r.p.m. With the injection of the new speed step, speeds approaching the performance of a d.c. motor with speed variation by field control are made possible. The motor is made in either constant horsepower or constant torque with any combination of speeds for 60-cycle circuits. The same ratings will be furnished for other frequencies and likewise two-phase.

YOU KNOW WHAT THE GOVERNOR OF NORTH CAROLINA SAID——

It is seldom that we are given the opportunity of printing a picture of such an illustrious gathering as the above. Governor Davis of Idaho is giving T. E. Bibbins, president of the Pacific States Electric Company, a lecture on golf etiquette, while Mrs. Bibbins listens. Included in the Governor's remarks were probably the following: "Never pick up your ball until it stops rolling. Always kick your opponent's ball into a sand trap whenever you get a chance. When your opponent accidentally shoots into the rough always remark, 'Hard luck, old man. Thank goodness!'"

Business Outlook in Western Market Centers

Reflecting the Trend of Community Thought on Conditions and Events Affecting Business and Industrial Activities Throughout the West

Compiled and edited for the Journal of Electricity and Western Industry by correspondents in all principal Western cities.

SPOKANE

Business conditions considered as a whole are good. The surplus of money in the banks has not been so large since 1917 and savings accounts showed an increase for July. The lumber business is good, almost booming. All mills are running, many of them two shifts and the demand is equalling if not exceeding the output in many cases. Price advances are predicted with a continuation of present conditions.

Mining is good and getting better. A large number of mines and prospects are operating and the larger properties complain that they cannot get enough miners. The Bunker Hill and Sullivan Mining and Concentrating company which intended to blow in a second furnace at its smelter at Kellogg early in July could not do so for shortage of experienced men.

House building operations in Spokane continue to exceed all records for more than 10 years. This has a bad side, in that it has made it difficult to sell the older houses and real estate men are complaining.

PORTLAND

With over three months of very dry weather the forest situation throughout the Northwest is growing worse daily. Most of the fires have been in the state of Washington where millions of dollars of damage has been done.

Although July is normally a quiet month in building construction the value of permits issued in Portland during July of this year exceeded in value those of last year by more than 25 per cent.

The railroad strike so far has had very little effect on industry and business in this section. If the strike continues, however, it is probable that business will suffer.

Electrical jobbers, coneractor-dealers and central stations find business very satisfactory and predict a steady improvement during the fall and winter.

LOS ANGELES

Los Angeles ranked third among the cities of the United States in building for the first six months of 1922 with an amount of $59,459,250.00, being led by only Chicago and New York City. Building activity for the month of July, though not as high as the preceding three months shows a gain of almost 50 per cent in valuation as compared with July 1921. During the month the total number of building permits issued was 3,393 with an estimated valuation of $8,064,018.

Bank clearings for the month of July amounted to $426,580,859.39, which is an increase of approximately 30 per cent over July 1921.

The electric supply business continues to be good owing to the large amount of building and the manufacturers of large apparatus continue to report sales. The electric retail busines has held up well during the unusually dull summer months, but there has been a marked decline in the sale of radio apparatus.

Plans are practically complete for California's Pageant of Progress and Industrial Trade Exposition as sponsored by the Los Angeles Chamber of Commerce, which is to be held August 26th to September 9th inclusive.

SALT LAKE CITY

The reports of the U. S. Geological survey for the first half of 1922, covering Utah and adjoining states, show that metal mining in all these states is experiencing a decided revival after a year or more of stagnation such as the industry has never before experienced. Metal prices are increasing gradually, freight rates have been reduced, and labor conditions are better than for some time.

Building activity in the larger towns continues unabated. In Salt Lake City particularly there is a sharp demand for homes. Electrical contractors and dealers are receiving a fair volume of business on this account, and are making intensive efforts to educate the home-builder to the advantages of a greater use of electricity in the home.

In various lines of retail trade business is generally fair, with collections slightly improving. Dealers in lumber and building materials report a good business.

Crop conditions are good. Sugar factories are getting ready for their fall campaign on sugar-making, with prospects of a good crop of sugar beets.

SEATTLE

Forest fires of a serious nature continue to hamper logging in all parts of the Pacific Northwest, and a number of camps have closed down by order of the State Forestry Department. As a result stocks on the West Coast are lower than for many months past, and there will be no appreciable replenishment until after a heavy rainfall, permitting camps to resume.

Building operations throughout the state have resumed on such a scale that there is claimed to be a shortage of sand and gravel, which is embarrassing the highway division in its paving program this summer. A labor shortage is also reported in many lines of industry, particularly on highway work and in farming sections. The apple harvest will absorb thousands of workers for at least two months, and the employment problem is in very satisfactory conodition at present.

Retail trade has been fairly brisk during the past two months, stimulated, no doubt by the interest created in Northwest products through the big merchants' convention during the month of July, with consequent extensive advertising of all local products.

DENVER

In a report on business conditions in this city and the district tributary to it John C. Mitchell, president of the Denver National Bank, says:

"General crop conditions are better than last year though the sugar beet acreage is 25 per cent less. Retail business is fair. Jobbing and wholesale transactions show fair increase. Merchandise stocks are low. Credits are fairly well liquidated in both city and country. Live stock is in good condition, with prices good.

"General labor conditions are good, few idle. Rail and coal labor, considering strikes, are fair and quiet at present. Coal output is 20 per cent more than sixty days ago.

"Denver bank clearings for July 1922 totalled $128,457,418, an increase of $20,513,543 over the same period a year go. Deposits are increasing.

"Permits for building in city for first seven months of year show increase of nearly five million dollars over same period last year. Total value of permits to date $10,329,275 with $1,097,275 credited to July, residence permits representing major portion."

SAN FRANCISCO

What would be an extraordinarily good summer business season is now more or less disturbed through apprehension felt as to how long the coal and rail strike will continue. There are reports of reduced production in certain lines, and the feeling is that after the rail strike is settled there will be difficulty in getting shipments through. Delays are now numerous, cars difficult to obtain, because the effectiveness of the railroad engine power is declining. Orders for fall merchandise have been large, crop conditions being favorable, and the country districts have been expected to come back strong. This has caused firmer prices in foodstuffs and in many commodities, but commitments the past week have shown a falling off, due to the uncertainty in national affairs.

Fundamentally conditions are favorable for continued better business, and with more settled conditions again prevailing the lull will be but temporary.

Construction News and Industrial Developments

Suggesting to the Engineer, Contractor, Manufacturer, Dealer, Agent and All Business Men Opportunities for New Business

Bridges

Arizona, Phoenix—W. D. Northern Co. of Phoenix was awarded contract by Maricopa county highway commission for the construction of a reinforced concrete bridge over New River at $34,617.50.

Cal., San Francisco—Contracts totaling $66,972 for the new steel bridge at Six Bit Gulch on the Hetch Hetchy railway have been recommended by City Engineer O'Shaughnessy. The contracts are as follows: Union Construction Company, steel work, $26,132; Schultz Construction Company, concrete piers, $32,940; M. J. Lyons, grading and laying track, $7,900.

Cal., Sacramento—Contract for a bridge across Bear River, between Placer and Nevada counties, has been awarded by the State Highway Commission to the Security Bridge Company, of Ogden, on a bid of $28,250.

Cal., Sacramento—Contracts have been awarded by the California Highway Commission to Parlier and Lowry of Tulare for construction of a bridge over the Cuyama River on the so-called Cuyama lateral between Santa Marie and Bakersfield. Eight bids were received. The low bid was $50,819.71 as compared with an estimate of $58,783.50 by the Engineering Department of the California Highway Commission.

Ore., Salem—The highway commission announces the award of the contract to H. E. Doering, 568 Maple street, Portland, Ore., for the construction of a reinforced concrete arch bridge across the North Umpqua River on the Pacific highway at Winchester, near Roseburg. The total cost will be approximately $125,000, in which Douglas county, the state of Oregon and the federal government are cooperating.

Buildings (Industrial)

Cal., Oakland—The Foundation Company of San Francisco has been awarded the contract for the erection of the first unit of the General Electric Company's plant at 54th Avenue and 14th Street, to cost $90,000.

Cal., Pittsburg—Plans have been prepared by B. G. McDougall, of San Francisco, architect, for three manufacturing buildings to be added to the plant of the Pioneer Rubber Mills of this city as a part of the $500,000 development program recently authorized by the directors.

Cal., San Francisco—Plans are being completed by O'Brien Bros., architects, for a three-story reinforced concrete factory building for Louis R. Lurie to be located on Bryant Street, near Second. Vukicevich & Bagge, 180 Jessie St., are the contractors.

Cal., San Francisco—Ralph McLeran & Co., recent purchasers of property bounded by Mariposa, Harrison and Alabama Streets, will start immediately the erection of a two-story warehouse which has been leased by the Illinois-Pacific Glass Company.

Cal., Sacramento—Erection of a new cannery at Isleton for the purpose of canning asparagus and spinach has been announced by Walter I. Hechtman and Wilbur F. Gardiner at a recent meeting of the California Asparagus Growers' Association in Walnut Grove. The new cannery will have a capacity of approximately 150,000 cases of asparagus each season.

Idaho, Nampa—Construction will start soon on the new ice storage building of the Pacific Fruit Express here. The cost is about $50,000.

Ore., Independence—A planing mill of sufficient capacity to handle the 10,000,000 feet of lumber in the yard, is being installed by the Fostern Lumber Co., on the site of the fire devastated plant just this side of Kings Valley.

Ore., Portland—A $60,000 factory will be erected immediately at East Twenty-second street and Sandy boulevard by the recently organized Stenno Carbon Paper Manufacturing company, according to H. H. Ward, president of the concern. The factory will be one story in height and will be of reinforced concrete with metal sash. The contract has been let to the Hurley-Mason company.

Ore., Portland—The Webster Chair Co. with headquarters in Superior, Wisconsin, is negotiating with contractors for a new building to be erected in the near future on land measuring 100 x 200 ft., purchased by the company recently at 26th and Nicolai streets. The building will be of concrete, four stories high, and will be occupied by the Portland branch of the factory. It will be erected under the direction of F. Thomas, manager of the Oregon branch. Actual construction will be started in a month.

Wash., Spokane—Construction work is to begin at once on a $10,000 factory and sales room for the Harold Furnace Company.

Wash., Spokane—The Adam Brown Packing plant, 116 Havana street, destroyed in a $50,000 fire, will be rebuilt as soon as satisfactory adjustments can be made with fire insurance companies, Adam Brown, proprietor, has announced. The new plant will be modern in every way and will cost approximately $30,000, in addition to equipment.

Wash., Tacoma—Thos. Carstens has started construction on the first unit of his reinforced concrete and steel packing plant which, with equipment, will cost $1,500,000. The plans have been approved by the federal government. It is expected that this unit will be completed and equipped in about six months.

Wash., Aberdeen—The West Coast Fish Company has been incorporated by A. Karl, George Swansen and John Marilla, for the purpose of establishing a clam cannery. Firm has capital stock of $15,000.

Wash., Kelso—The Long Bell Lumber Company plans the erection of two large sawmills on the Columbia River, one near Kelso and the other at Rainier, Ore., and to begin logging of the company's 60,000 acres of timber lands. A 15-mile railroad has been surveyed and will be built, and several hundred thousand dollars spent in dyke protection.

Buildings (Miscellaneous)

Cal., San Francisco — Market — The Crystal Palace Market Co., 1175 Market St., is planning the erection of a one-story steel frame market on the south side of Market St., 205 ft. east of Eighth. D. C. Coleman, architect. Estimated cost, $250,000.

Cal., Yuba City—School—Bonds in favor of a union high school to be located in Yuba City were carried at a recent election here.

Cal., San Francisco—The American Legion Auditorium, northeast corner of Turk and Polk Streets, to cost $400,000, will be completed by Feb. 1, according to plans recently announced. The building is being constructed by Golden Gate Post No. 40 and will be leased by Louis R. Lurie for a period of 15 years at a total rental of $500,000. The plans include attractive lodge rooms for Golden Gate Post; the auditorium stage will be one of the largest in the city and is specially designed for the presentation of grand opera and high class concerts.

Cal., San Francisco—Louis R. Lurie has purchased the property at the northwest corner of Fifth and Clementina Streets where he will erect a two-story concrete building to cost $70,000.

Cal., San Francisco—Apartments — Construction work on the Francesca Apartments, southeast corner of Sacramento and Powell Streets, has been started by the contractors, MacDonald and Kahn. The building will be a ten-story, Class A, steel, fireproof apartment house, and will cost $750,000. It will contain 225 rooms in various units of apartments ranging from four to twelve rooms. The owners are the Sacramento-Powell Company, of which A. C. Blumenthal is president.

Cal., San Francisco—Office Building—A syndicate of San Francisco men, for whom A. C. Blumenthal & Co. are the agents, has purchased the Winter Garden property in Los Angeles, where a 12-story office building, designed especially for financial concerns, will be erected.

Cal., Napa—Packing Plant—Contract for an addition to the Growers' Packing and Warehouse Company's plant here, has been let to the West Coast Construction Company. The contract price is $65,000.

Cal., Sacramento—School — Preliminary plans for the high school structures have been approved by the board of education and the supervisors have been directed to sell $750,000 worth of high school bonds. The new buildings will include 48 class rooms, vocational training and junior college departments, gymnasiums and cafeteria. Edgar A. Matthews is the architect.

Cal., San Francisco—Post Office—Bids for the new ferry post office will close August 31, according to recent announcement by Postmaster James E. Power. The site must be located near the ferry building and be of sufficient size to permit a building with 25,000 sq. ft. of ground floor.

Cal., San Francisco — Telephone Station—A new fifty-booth telephone pay station will be constructed at 105 Powell Street by the Pacific Telephone and Telegraph Company at a cost of approximately $30,000.

Cal., Oakland—Asylum—Plans are being prepared in the office of George B. McDougall, state architect, Forum Building, Sacramento, for the Oakland State Blind Asylum to be erected on Telegraph Avenue. There will be a two-story employes' building, a one-story women's shop building and a one-story recreation and power house building, all to be of brick construction. The cost is estimated at $70,000.

Cal., Modesto—Hospital—Brown and Stafford, of Madera, have been awarded contract for the erection of a hospital at Ahwahnee, Madera county, for $43,518.

Cal., Los Angeles — Institution — The Good Shepherd Home which is to be built near Pico Street on Arlington Street, will cost approximately $250,000. The buildings are to be of fireproof construction. In addition to the main building there will be a chapel. A. C. Martin is the architect for the home.

Cal., Sacramento — Apartments, Stores—The Capital Construction Company has started clearing the lot on I Street between Seventh and Eighth Streets, where a three-story and basement reinforced concrete building will be rected. The property was recently acquired by B. S. Berry, of San Francisco, representing a syndicate of that city. The building will cost approximately $50,000; the first floor will be leased for commercial purposes and the upper floors will contain eight two-room apartments.

Cal., Sacramento—Office—Bids for the erection of the new state printing office will be called for August 18. The building is to be located at the southwest corner of 11th and O Streets. George B. McDougall is state architect.

Cal., Van Nuys—Store—L. S. Granger has awarded the contract for a store building to be erected on Sherman Way between Erwin and Calvert Streets to Frank Tiara, local builder.

Cal., Van Nuys—Hotel—G. W. Clark, special representative of the Apartment Building Co., of Los Angeles, is here negotiating for a site on which his company proposes to erect a modern hotel building to cost between $40,000 and $50,000. Two sites located near the center of town are under consideration.

Cal., Pasadena — Club Building—The faculty club building and electrical tower building, which are to be erected at Throop Institute of Technology, will cost $175,000. The buildings are to be hollow tile and reinforced concrete construction. B. G. Goodhue of New York and C. M. Winslow are the architects for the buildings.

Cal., Los Angeles—Apartments — Gregory R. Evans has prepared plans and will erect a 3-story and basement apartment house on Westmoreland Ave., betwen 7th St. and Leeward Ave.; ninety-one rooms, 44 apartments, to cost $85,000.

Cal., Los Angeles—Store — Stanton, Reed & Hibbard, 620 Metropolitan Bldg., are completing plans and specifications for an 8-story and basement, Class A store and loft building on Hill Street between 6th and 7th Streets, for Starr Piano Company, to cost $250,000. Present building on site is now being wrecked.

Cal., Los Angeles—Post Office—Wurster Construction Company has contract for the new railway terminal post office building at Third St. and Central Ave. for the Terminal Devlopment Co. Cost to be about $300,000. Foulkes Electric Co. has wiring contract.

Cal., Los Angeles — Apartments — Geo. M. Easton has contract for a 4-story brick store and apartment building to be erected at 5169 Hollywood Blvd. for Oscar Wilson. It will contain 4 stores, 90 rooms divided into 43 apartments. Cost to be $80,000.

Highways

Cal., Los Angeles — Fairchild-Gilmore-Wilton Co. was awarded contracts by the board of public works for paving Ninth St., between Boyle and Santa Fe Aves., at $18,986.71, and for paving Manchester Ave. between Vermont and Western Ave. at $34,637.74.

Cal., San Bernardino—Utah Construction Co., San Francisco, was awarded contract for constructing Big Bear Valley road in Angeles National Forest, San Bernardino county, of approximately 10.4 miles. This new road will connect with the Crest Route at a junction 5 miles east of the City Creek road summit and will extend through Fish Camp across North Fork Creek and up Bear Creek, entering Big Bear Valley near the dam. The road is expected to cost approximately $270,000.

Cal., San Gabriel—A total of $375,000 will be expended on the 11 miles of road now under construction in San Gabriel Canyon. About 8½ miles of the new road have been completed. This road, besides opening up a mountain wonderland, will provide a new route from the south into the Antelope Valley. The canyon lies in the Angeles National Forest reserve.

Cal., Santa Monica—Santa Monica-Ocean Park chamber of commerce has unanimously endorsed a proposition for a bond issue to open and widen some 15 streets, including the Trolleyway, Main St., Pier Ave. and Washington Blvd., in the Ocean Park section, and the joint opening of Second and Third Sts. and Michigan and Pennsylvania Ave. in the center of the city.

Cal., Sacramento—The State Highway Commission has awarded contract for grading 16 miles of road from Auburn to Colfax to C. H. and A. W. Gorrill, Oakland, on a bid of $408,954.

Cal., Sacramento—A contract for paving approximately eleven miles of highway between the city of Colusa and Long Bridge in Sutter county on the Tahoe-Ukiah cross-state road in all probability will be awarded to Bonnell, Savage & Fenn, a Tacoma, Wash., firm, at the next meeting of the State Highway Commission. The bid of the Washington firm, which totals $113,764.80, with the use of corrugated metal pipes for culverts, and $113,972.80, with the use of reinforced concrete pipes, is the lowest of several filed with the Highway Commission and about $13,000 below the official estimate of the road body. Low bids submitted on other projects are as follows: Inyo county—Grading 11.7 miles near Fish Springs School: lowest bid of $67,333.50, filed by Redmond, Page & Pond. Official estimate, $64,036. Kern county—Grading of 3.6 miles between Cottonwood Creek and First Crossing Kern River; lowest bid of $281,-157 filed by W. S. Mead of San Francisco. Official estimate, $248,052. Madera county—Surfacing with asphalt concrete eight miles between Arcola School and Borden Station; lowest bid of $13,860 filed by the Federal Construction Company of San Francisco. Official estimate, $15,-400.

Cal., Sacramento—The State Highway Commission has awarded contracts for the grading of a road in Placer county and for the construction of a bridge across Bear River, between Placer and Nevada counties. The contract for the grading of sixteen miles of road from Auburn to Colfax was awarded to C. H. and A. W. Gorrill, Oakland, on a bid of $408,-954.90. The bridge contract was awarded to the Security Bridge Company, Ogden, Utah, on a bid of $28,250.50.

Cal., Tracy—The city council has passed a resolution ordering the improvement of 11th Street, the main artery of the town, which is also the Lincoln Highway. The street will be paved to a width of 40 ft. with a 5-in. reinforced concrete base topped with 1½ in. of natural bitumen. It will be paved for a distance of 6,600 ft.

Colo., Libby—Contract for the section of Roosevelt highway to be built by government funds has been let to Siems and Carlson, of Spokane, Wash., price $99,339.

Ida., Spencer—Contract for the construction of the Forest Service Highway from a point north of Spencer to Monida, has been let to Coolidge & Co., a large contracting firm with branch offices at Pocatello; price, $42,700.

Ore., Pendleton—A contract has been let to the Johnson Construction Company to build four miles of road in the east end of Umatilla county, near Weston, known as the Pine Creek road, at a price of approximately $49,000.

Utah, Ogden — Fred Coolidge of Laramie, Wyo., was awarded the contract for the building of fourteen miles of road on the Montpelier-Afton project for $21,000, according to the announcement from the office of the bureau of public roads.

Wash., Tacoma—Contract for grading and graveling a section of the Gig Harbor-Long Branch Highway, has been awarded by Pierce County Commissioners to Sweeney & Holz of Tacoma, on their bid of $23,888.

Wash., Waterville — The Mohr Construction Company, Waterville, on its bid of $37,601.80, received the contract for improving a 3-mile connecting link of permanent highway No. 10, in Douglas county.

Wash., Olympia—Bids will be opened on September 5 by the State Highway Commission for the grading and graveling of nearly 20 miles of water grade highway from Yakima to Ellensburg. The work is estimated to cost $700,000, half to be paid by the state and the other half by the Department of Agriculture.

Irrigation Projects

Cal., Oroville—George Pollock, contractor, has been awarded the contract for excavating 80,000 cubic yards of earth in Section 1 of the main drainage canal of Reclamation District No. 833. Pollock's bid was 35 cents per cubic yard, which was lower than the other two bidders, Dan Bayles and John Phillips.

Cal., Ventura—Boyd E. Gabbert of Ventura has filed application with the division of water rights, state department of public works, for a permit to appropriate 22,000 acre-feet per annum of the waters of Matilija creek to irrigate 8,500 acres on Rancho Ojai, Ventura county. It is proposed to build a dam 170 ft. high at a cost of $1,000,000.

Cal., Sacramento—A special bond election for approximately $8,000,000 to cover Sutter-Butte by-pass assessment No. 6 of the Sacramento-San Joaquin drainage district, has been set tentatively for September 2, it was announced by the State Reclamation Board. The date originally had been set tentatively for August 26, but was postponed because more time was needed to prepare the necessary papers. The bonds, it is proposed, will be used to cover delinquent assessments.

Cal., Marysville—Preliminary work is getting under way in the $24,000,000 project of the Yuba Development Company. Contract has been let to R. H. Mahoney, of San Francisco, for the hauling of 250,000 sacks of cement and other materials for the building of a dam over the Yuba River, which will be one of a series of five included in the project. Following the dam construction several large power houses will be erected for the development of electrical energy, and extensive irrigation work is included in the plans.

Cal., Modesto—Directors of the Modesto Irrigation District at a recent meeting instructed P. F. Jones, chief engineer, to prepare plans and specifications for a transmission line from the Don Pedro power house to Modesto, also for a substation to be built in this city, at a cost of approximately $79,000.

Ore., Klamath Falls—Irrigation and resultant development of the 1,000 acres of rich land in the Malin and Shasta View districts of Klamath county is seen in the signing of a contract between the districts and the Government and the voting of bond issues of $100,000 for the Malin and $120,000 for the Shasta View districts. Funds derived from sale of the bonds will be used in installation of a pumping plant and construction of a ditch.

Wash., Wenatchee—The Palisades Irrigation District has been organized under the state irrigation laws for the purpose of taking over and improving the irrigation system of the old Moses Coulee Fruit Lands Company formerly owned and controlled by George A. Virtue of Seattle. Temporary officers are A. L. Dirkes, president, Wallace Hart, secretary.

Wash., Walla Walla—The board of directors of the Horse Heaven Irrigation District recently signed a contract with Contractor Howard Amon for construction of the proposed irrigation project. The final and permanent contract replaces

the former contract, which was hurriedly drawn and eliminates a number of objectionable features.

Power Plant Equipment

Cal., Oroville—Preparations to spend approximately $15,000 in construction and reconstruction work at Gridley and Biggs are being made by the Pacific Gas and Electric Company's office here. The work includes improvements to the Gridley substation, installations of regulators and other features of benefit to the service in and around Gridley and Biggs.

Power Projects

Wash., Spokane—Construction work will begin about August 1 on the new high-tension power line of the Washington Water Power Co. from Lind to Colfax and Pullman, it is reported. The cost is about $500,000.

Wash., Mukilteo—Work of installing the proposed extension of the power lines of the Puget Sound International Railway & Power Company from Everett to Mukilteo and around Lake Stevens, is progressing rapidly and the company expects to be able to furnish service by September 1.

Wash., Spokane—The Washington Water Power Company began work on August 1 on construction of the new high-tension power line from Lind to Colfax and Pullman. The line will be 100 miles long, carrying 60,000 to 110,000 volts, and will cost approximately $500,000. When completed, the power company will be able to supply electric power to the Palouse country from either end of the circuit.

Wash., Deer Park—Work will be started within 30 days on a new three-wire power line to carry 12,000 volts between Deer Park and Clayton, according to plans of the Mount Spokane Power Company, which has been granted a franchise by the Department of Public Works. The line will be nearly five miles long, and will supply between 75 and 100 residences and stores in Clayton with electricity.

Wash., Olympia—The Westside Rural Light and Power Company, here, has been formed by Thomas L. O'Leary, to furnish light and power to rural sections.

Wash., Wenatchee—Work on the proposed new transmission line that will bring 30,000 hp. of electrical energy into north central Washington has been started by the Washington Coast Utilities Company. The new line will cost $800,000, and will be built up Green River, following the Northern Pacific to Cle Elum and thence over the mountains to Wenatchee.

Railways

Alaska, Ketchican—The Alaska Petroleum Co. of Katallahave secured enough capital to complete the construction of the railroad started by that company two years ago, a distance of about 22 miles, which will start immediately. The company will also build a dock at Kanak Island about 12 miles from Katalla, which will necessitate the building of a trestle about 1½ miles from the mainland to the island, the cost being about $600,000.

Cal., San Diego—Improvements planned by the San Diego Electric Railway Company, and announced by President John D. Spreckels, include $350,000 for reconstruction of the double lines to East San Diego. Orders were sent forward for materials to cost $500,000.

Cal., San Francisco—Bids for the construction of twenty "J" and "K" type cars, trucks, bodies, air-brake equipment and motor equipment, costing approximately $350,000, were called for by the board of public works. The cars will be used on the municipal railway. Bids will be opened September 26.

Cal., Santa Monica—Santa Monica will receive bids August 20 for a blanket franchise for a transportation system within the city limits. The Pacific Electric Railway Co. and the Bay Cities Transportation Co. will compete for the franchise. The city reserves the right under the terms of the ordinance not to accept the highest bid, but to grant the franchise to the company which offers to furnish the best transportation facilities.

Street Lighting Systems

Cal., Los Angeles—City council has adopted an ordinance ordering lighting posts and appliances in the following streets: Sixth St. between Pacific Ave. and Harbor Blvd., San Pedro and Broadway, between 16th St. and Pico.

Cal., Los Angeles—Bids are being received by board of public works for constructing an ornamental lighting system in Buckingham Rd. between 16th and Washington Sts.

Utah, Farmington—The Utah Power & Light Company has just finished the installation of a new street lighting system for the city of Farmington. Seven new 400 c.p. Novalux series street lights have been installed, in addition to several lights on the state highway.

Wash., Centralia—Bids have been called for for the installation of the ornamental curb lighting system. The city is to furnish cable, standard lighting units, transformers, time switches, lamps and cut-outs, the bidder to furnish all other material and labor.

Wash., Chehalis—City Clerk John West is receiving bids for installing and furnishing materials for an ornamental lighting system, the city to furnish cable, light, standards, etc.

Streets and Sewers

Cal., Culver City—Culver City is now in a position to proceed with the construction of a sewer system for which $75,000 bonds have been voted, the project having been deferred pending an agreement with Los Angeles city on the question of sewage disposal. Original plans of the engineers called for an activated sludge treatment plan, but under the agreement just made with the city of Los Angeles, sewage will be treated in a plant to be built and operated by Los Angeles. This arrangement is made in consideration of Culver City granting right of way through its corporate limits for the Los Angeles outfall line now being constructed.

Cal., Los Angeles—Los Angeles city council has definitely decided to call a special election for August 29, at the state primary, to vote on the proposed $12,000,000 bond issue for a new outfall sewer.

Cal., Pasadena—Preparations are being made to start construction of an activated sludge plant for treatment of sewage on the Pasadena sewer farm in about a month. This plant will be used jointly by Pasadena, Alhambra and South Pasadena. Pasadena has voted $325,000 bonds for the treatment plant and Alhambra has voted $300,000 bonds for a sewer system and treatment plant. South Pasadena will contribute $40,000. Work will be under direction of City Manager Koiner, Pasadena, City Manager Lorraine, Alhambra, and City Manager Orbison, South Pasadena, with the advisory assistance of their respective commissions.

Utah, Ogden—Fourteen contractors submitted bids to the city commission for the construction of four and one-half miles of water mains in the southern part of the city and extensions in other districts. The lowest bids were by the Western Engineering and Spencer Plumbing companies, both of Salt Lake. The bids were referred to the city engineer for tabulation and report. The Western Plumbing Company was low on three styles of pipe. They were: $139,773 on cast iron pipe; $155,367 on class C iron pipe, and $116,412 on Matheson joint pipe, galvanized and dipped. The Spencer Plumbing Company bid $117,676 on Matheson joint pipe dipped.

Wash., Seattle—The city council, after weeks of discussion, has ordered the paving of Olive Way, from Bellevenue Avenue to Olive Street, and Olive Street, to John Street and Harvard Avenue. The work will cost $200,000.

Wash., Walla Walla—The city commissioners have passed resolutions providing for the paving of four blocks of Poplar Street.

Water Works

Cal., Redlands—The East Lugonia Mutual Water Company, recently organized to expend $200,000 in the development of 600 in. of water in the Mill Creek cone above Mentone, has awarded the contract to H. Spiezze and Company for the sinking of three shafts, the first to be about 200 ft. deep.

Cal., Sacramento—The city council will receive bids until Aug. 24 for the construction of the pumping and filtration works of the city of Sacramento.

Cal., El Centro—Sale of $5,500,000 bonds of the Imperial Irrigation District for purchase of properties of the mutual water companies of the district has been made to the First Securities Company of Los Angeles and the Anglo-London-Paris Securities Co. of San Francisco. The bankers recommend that the marketing of the $2,000,000 bonds voted for drainage be deferred.

Cal., Lakeport—A bond issue for extension and improvement of Lakeport's water and sewer system carried at a recent election. Water bonds of $65,000 and $10,000 issue for sewers were included.

Ore., Coquille—A. B. Gidley received the contract for the construction of the water works improvements, including the Rink Creek dam and reservoir.

Ore., Portland—George S. Gaunt, mayor of Condon, has filed with State Engineer Cupper an application covering the appropriation of water from Hay Creek, tributary to John Day River, for a municipal supply for the city of Condon. The municipal project contemplated under this application includes the construction of four miles of pipe line with other improvements at a total estimated cost of $85,000.

Ore., Portland—The Willamette Iron & Steel Company has received a contract for the construction of 9,000 tons of steel pipe, 9 ft. in diameter, penstocks and other equipment to be used in 8½ miles of conduit to supply water to a new power plant which will be installed on the upper Clackamas River by the Portland Railway, Light and Power Co. The contract calls for the expenditure of approximately $1,000,000. It was announced that the work on the new pipe line would begin immediately after the completion of 25 miles of new roadway extending eastward from the end of the electric line at Cazadero. Cost of the completed project will be in the neighborhood of $3,500,000.

Wash., Tacoma—The municipal water department plans expenditure of $51,500 in repairs to the city water system, including an expense of $24,000 at the McMillan reservoir and $27,000 at the other reservoirs in the city, together with re-laying a large amount of concrete and cast iron pipe.

Miscellaneous

Ore., Bend—Kilns—Construction of ten dry kilns, making a total battery of 30, was started at the Shevlin-Hixon Co. plant here, the improvement, with other changes which it makes necessary, to mean an investment of $500,000. The type of kiln put out by the Northwest Blower Kiln Co., of Portland, will be installed.

Wash, Seattle—Dock—The Ames Shipbuilding & Drydock Company has awarded a contract to the Puget Sound Bridge & Dredging Company for an addition to the present West Waterway dock, to be 509 x 52 ft. in size, costing $35,000.